SERIES 3—Vol. 3, No. 8 AUGUST, 1920

# AMERICAN JOURNAL OF OPHTHALMOLOGY

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*Annual Subscription Ten Dollars in Advance,*
*Single Copies One Dollar.*

Published Monthly by The Ophthalmic Publishing Company,
7 West Madison Street, Chicago, Illinois.

Entered as Second Class Matter January 1st, 1918, at the Post Office, Chicago, Ill., under the act of March 3rd, 1879.

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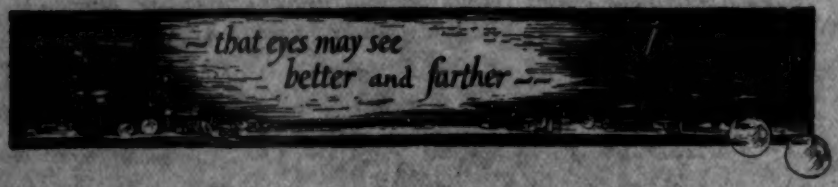

AMERICAN JOURNAL OF OPHTHALMOLOGY

Vol. 3 AUGUST, 1920 No. 8

# CATARACT OPERATION ON GLAUCOMATOUS PATIENTS

PROF. V. MORAX, M.D.

PARIS, FRANCE.

This discussion of cases in which cataract is developed after hypertension has been noticed, including two illustrative cases, was prepared as an address before the Section on Ophthalmology of the American Medical Association. But the absence of Dr. Morax from the meeting prevented its use on that occasion and its publication in the Transactions of the Section.

The coexistence of senile cataract and glaucoma, tho infrequent, gives rise to a series of problems, prognostics, operative indications and technic, which are among the gravest an oculist may have to solve.

We must establish categories of facts:

(a) In the first, of which we will not speak, opacification of the lens precedes hypertension. Acute or chronic glaucoma complicates the senile cataract.

(b) In the second category of facts, the study of which will form the subject of this communication, senile cataract develops in chronic, subacute or acute glaucomatous patients who have been affected for some time by hypertension, and in whom an iridectomy or sclerecto-iridectomy has allowed a satisfactory equilibrium of the ophthalmotonus to be maintained.

When we are in the presence of such a case, a certain number of questions crop up in our mind:

May we and must we operate?

At what time of the evolution of the cataract is it most suitable to operate?

In what manner shall we intervene for the extraction of the lens, and for the maintenance of the fistulous scar which prevents the loss of the retinal function?

What will be the functional result, and how long will the function last?

I do not think there are many of us who are able to base their conviction upon a great number of cases. But is not that a reason to solicit the reporting of individual results, from which we shall perhaps be able to answer the preceding questions?

Bearing on a certain number of observations, of which I shall report the two most typical, and at the same time the longest followed, I will answer affirmatively the question: "May we and must we operate?"

There will, evidently, always be pusillanimous confrères who will not care to intervene in such delicate cases, but we think that the question ought to be viewed from a high point of view; provided that the operator is confident in his technic and rather high-minded, so as never to refuse the life-buoy to those whose sight is in danger of drowning.

In order to fix the moment of opportune intervention, I do not think it is necessary to proceed otherwise than in any case of opacification of the lens. For some time my only guide in the operative indication of the extraction of the lens was the state of visual function. In a patient in whom the acuity of one eye is sufficient, the extraction of the cataract on the other eye is never urgent.

If, on the contrary, both eyes are affected in a similar manner, it will not be necessary to wait for the complete maturity of the cataract in order to operate. This rule can be applied to glaucomatous eyes, as well as to patients whose ocular tension has always been normal. Up to the pres-

ent, my practice has not shown me that there was any interest in considering the question in another manner.

As to the two other questions concerning the best technic and the functional prognosis, I consider myself unable to answer otherwise than by relating two observations, of which one case gave a rather poor result, whereas the other may be considered as a decided success:

CASES.

CASE 1.—Mrs. P. lived in the constant fear of becoming blind; her mother died a blind woman with glaucoma and cataract. Her sister was also affected with glaucoma, and became blind in spite of an operation. Our patient's sight was always excellent till 1908, when she was sixty-one years old. She then had from time to time troubles in her left eye and saw coloured rings around the lights. The left eye was found to be slightly myopic, and this myopia increased in one year. On my first examination (in May, 1910) I found:

In the left eye myopia minus 5, with acuity one-half.

In the right eye emmetropia, acuity eight-tenths.

No modifications in the field of vision.

As the patient would not hear of an operation I could only prescribe the regular use of myotics. During two years I was able to control the vision and tension, and follow the increasing of the myopia of the lens in the left eye, without any change in the acuity. When the myotic was regularly used the tension of the eyes was normal, but one day, as the patient had ceased the use of this for eighteen hours, I found:

Right eye; forty-five millimetres of mercury.

Left eye—fifty millimetres of mercury.

I insisted upon the necessity of surgical intervention and I heard some time later than an iridectomy had been performed by a confrère.

During the year 1913, the patient came back to me because she had been told of a cataract on her left eye; she incriminated her operator. It was not a traumatic cataract, but the natural evolution of the modification of her lens.

The tonometer gave the same indication in both eyes under pilocarpin: twenty-eight millimetres of mercury.

But from time to time new troubles appeared, when the patient discontinued her treatment, so I advised sclerecto-iridectomy for the right eye. The operation was performed with Elliott's technic and peripheral iridectomy. The result was very satisfactory and a good filtering scar was obtained. The tension oscillated between ten and thirteen millimetres of mercury.

One year later the tension was still the same, but the myopia of the lens had become more marked:

In July, 1916: Right eye—with minus 5, acuity equal to one-third. Visual field normal. Left eye—with minus 9, acuity one-fifth. Nasal contraction of the visual field.

On account of the visual trouble and the constant preoccupation of the patient, I advised the performing of cataract extraction of the left eye. The operation was done in January, 1918 without incident.

The result, which has not varied since, is a good one. The scleral section which was placed peripherally has left a small filtering scar, and the tension at present is twenty-four millimetres of mercury. The acuity reaches one-third with the correction of aphakia.

On the right eye the filtering scar is still active and the tension low. The increase of the opacity of the lens reduces the acuity to one-tenth.

COMMENT.—This observation is interesting from more than one standpoint: It allows one to follow the evolution of the modifications of the lens in both eyes. The beginning of myopia of the lens before any intervention, and its slow growth, show that there is no relation between these modifications and the operations.

The comparison of the patient's two eyes is also interesting: one eye being

operated by simple iridectomy and the other by sclerecto-iridectomy. In the left eye, in spite of the iridectomy and the inconstant use of pilocarpin, the tension was not sufficiently lowered, since the visual field has been reduced on the nasal side. In the eye operated by sclerecto-iridectomy the filtrating scar has, for the last seven years, given a permanent result as regards tension.

We must now examine the extraction of the lens from the left eye: Let us notice that, in spite of the so-called nonmatured state of the cataract, the extraction was performed completely and without incident. The pupil is as transparent as possible.

As regards tension, the effect of extraction is good. and the result would have been excellent if the visual function had not been partially reduced by the hypertension.

CASE 2.—Mr. O. asked my advice in 1910. He is a strong fellow of about sixty who, from 1905, had experienced troubles in the right eye; but neglected them, and when I saw him had almost completely lost the use of it.

As the left eye was beginning to weaken he became anxious. I found in the right eye, excavation with atrophy of the disk; weak sensations of light excentrically. In the left, beginning of excavation and some peripheral opacity of the lens; acuity two-thirds, visual field normal.

I advised the regular use of pilocarpin, but the patient was very negligent in his treatment. Two years later I saw him again. The tension had reached thirty-five millimetres of mercury. The opacities of the lens had increased somewhat and troubled the vision when the pupil was contracted by pilocarpin. I therefore advised a sclerecto-iridectomy, but the patient refused to be operated, and for four years I saw nothing of him.

In January, 1916, he came back; the acuity of the left eye was one-half; the tension reached fifty millimetres of mercury, and the visual field was contracted on the nasal side. The tension remained the same after pilocarpin. This time the patient consented to be operated upon, and sclerecto-iridectomy was performed in March,—sclerectomy with the Vacher forceps and wide iridectomy. The recovery was normal, but no filtering scar was obtained. Four months later the tension reached forty millimetres of mercury; acuity one-third.

I advised an anterior sclerotomy, which was performed in October, 1916, but the tension had not changed several days after, so that I performed a second sclerecto-iridectomy at the end of the month. The trephining was done with the one millimetre Bowman trephine. It was followed by a good filtering scar, and the tension was lowered to 12-15 millimetres of mercury for more than a year. But the cataractous process increased during this year, and in March, 1918, the patient requested the extraction of his lens.

I acceded, and in order to maintain the filtering scar I placed my sclerocorneal incision on the side between XI to IV o'clock. The extraction followed without incident and the patient was able to leave the clinic a week later. The anterior chamber was reestablished on the second day, but we noticed that the filtering scar was no longer protruding. Nevertheless, the tension was good.

In May the tension rose in spite of the use of pilocarpin.

A third sclerecto-iridectomy was performed, with the same technic, at the end of May; and in the same sitting the posterior capsule was cut away.

After this last operation the patient could count fingers at one metre, but as the third sclerecto-iridectomy did not leave a filtering scar a new rise of tension occurred. Sight was lost in less than a year.

COMMENT.—The history of this patient shows us that we must not despair of obtaining a reduction of tension in a patient on whom a first sclerecto-iridectomy has not given the desired result. It was, in reality, after the third intervention that the filtering scar was obtained; thanks to which the vision was maintained, and it failed only by the progressive opacification of the lens.

The extraction of the lens presented neither difficulties nor postoperative incidents. But notwithstanding the care in placing the incision outside of the filtering scar, the latter obliterated itself during repair and in the absence of all infectious phenomena. The consequence was the return of hypertension.

Perhaps we should have been able to get a more durable result if the third sclerecto-iridectomy had been as successful as the second one.

The improvements realized in the technic of sclerecto-iridectomy are very important, but no matter what the process is, we are never sure of obtaining a filtering scar. Of the three sclerecto-iridectomy operations performed on the patient, one only was followed by a scar assuring the equilibrium of the ocular tonus.

## NATURE OF THE SOCALLED BLOOD INFILTRATION OF THE CORNEA

Dr. Y. Matsuoka,

KIOTO, JAPAN.

This investigation made in the University Eye Clinic at Kioto under Prof. Ichikawa seems to throw light on the exact nature of the material causing the corneal discoloration and the process by which it arises. Translated from the German manuscript by Dr. J. D. Heitger.

That the cornea of an eye with a traumatic hemorrhage of the anterior chamber shows sometimes a peculiar reddish brown or yellowish green ring-like orbicular opacity has been known since the first communication of Schmidt-Rimpler (1875). The first author to give to this opacity the designation, "Blood Infiltration of the Cornea" was Hirschberg (1896).

Histologically this so-called blood infiltration of the cornea distinguishes itself thru a rich appearance of peculiar round to spindle shaped, highly refracting granules in the parenchyma of the cornea. These granules have been hitherto variously interpreted by different authors, for example by Baumgarten (1885) as types of organisms, by Leber (1884) as crystallized fibrin, by Vossius (1898) as hyalin degenerated corneal fibrils, by Nishimura (1915) as hemoglobin derived hyalin substance, by Treacher Collins (1896), Pincus (1896), Hotz (1900), O. Dodd (1901), and Buchanan (1912), as hematoidin, by Kusama (1914) as melanosiderin, by Römer (1900) and Löhlein (1907) as an albuminous mass separated from hemoglobin.

In the following I desire to report some conditions which appear to be of great importance in the explanation of these obscure granules.

Recently I have had the opportunity to study histologically two cases of traumatic opacity of the vitreous. In one of these, in which the vitreous by focal illumination was clinically dark green colored, I could point out in streak preparations of the vitreous, abundant fine round granules. In the second, which moreover still showed in the cornea the typical picture of so-called blood infiltration of the cornea, I could find abundant spindle shaped to round granules in the vitreous, as well as in the corneal parenchyma.

This remarkable condition in the first case, namely that in a case of traumatic vitreous hemorrhage peculiar granules are found in the vitreous, has not been mentioned before. Are they not identical with the granules found in the corneal parenchyma in the socalled blood infiltration of the cornea? This is the question which presented itself to me.

The second case, which, besides the vitreous hemorrhage with the afore mentioned granule condition, showed in the cornea the typical picture of socalled blood infiltration of the cornea, gave me the best opportunity for answering this question.

CLINICAL HISTORIES AND HISTOLOGIC CONDITIONS

CASE 1. A twenty-one year old shoemaker. On March 8, 1916, his right eye was punctured with a needle. At that time a physician excised the prolapsed iris twice. On April 6th he noticed that his previously healthy left eye was weak. Received at the clinic April 7th. Present Condition: A well nourished man of great stature. Head, nose and ears are normal. Thorax and abdomen intact. Urine negative. Wassermann reaction negative.

*Condition of eyes:* The right (injured) eye presents considerable ciliary injection. Near the temporal edge of the cornea one finds in the sclera a scar of brown color, about 2 mm. long and almost horizontal. The cornea is quite clear. No precipitates. No blood in the anterior chamber. No iris is visible. Lens clear. By oblique illumination one sees in the vitreous abundant dark green cloudy opacities, which move here and there irregularly with the movements of the eyes. The fundus is barely visible. Tension normal.

The left eye is outwardly normal. No precipitates. Iris and pupil are likewise normal. In the fundus the papilla is markedly clouded and hyperemic; its edges have disappeared. The retina adjoining the papilla is also more or less clouded while the peripheral retina appears normal. The retinal vessels are full and tortuous. Nowhere hemorrhage or pigment proliferation nor white spots. The visual field of the left eye has a normal peripheral boundary, while in the middle there is a large ring scotoma. Vision: R.=Fingers. (Projection good). L.= 6/18.

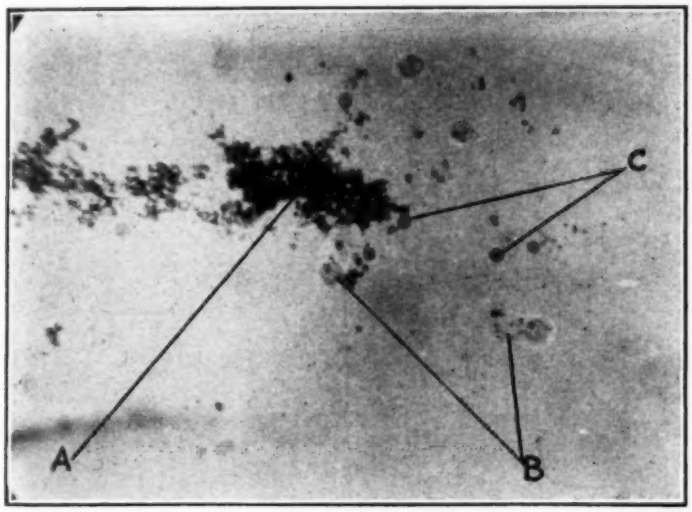


Fig. 1.—Smear from vitreous clouding in Case 2. A—Free granules in vitreous. B—Granules in the so-called blood cell shadows. C—Relatively well pre-served erythrocytes.

*Clinical Diagnosis*: Conjunctival and scleral scar, artificial aniridia, vitreous opacity right eye. Suspicion of sympathetic neuroretinitis of left eye.

*Course*: April 11th (34 days after the injury and 24 days after the second operation (done somewhere else) the right eye was enucleated. After that the course was happy in that the left eye had normal vision on June 18th, and the neuroretinitic changes were much better.

*Microscopic*: The enucleated eyeball was fixed in Orth's mixture. After sufficient fixation, the eyeball was divided into two parts by an equatorial cut. From the vitreous, which showed not diffuse but sporadically cloudy brownish green opacities, several parts were taken and examined in teased preparations.

For staining there came for consideration hematoxylin eosin, ironhematoxylin (Heidenhain) Mallory's stain, etc.

Microscopically the opacities were made up of small round granules of different sizes; the largest itself being about ¼ the size of a red blood cell, the smallest about the size of a grain of dust. With eosin they stain rose red, with Mallory's stain sudan red, and with iron hematoxylin, deep blue.

The lower half is somewhat clouded, not gray but more brownish green and less marked than above.

This green opacity is seated in the deeper layers of the cornea, is orbicular in shape and is divided from the limbus by a relatively clear zone about 1 mm. wide. Iris and pupil as well as they can be seen thru the corneal opacity are totally covered by a blood mass. The bulb is tolerably tender to touch. Intra-

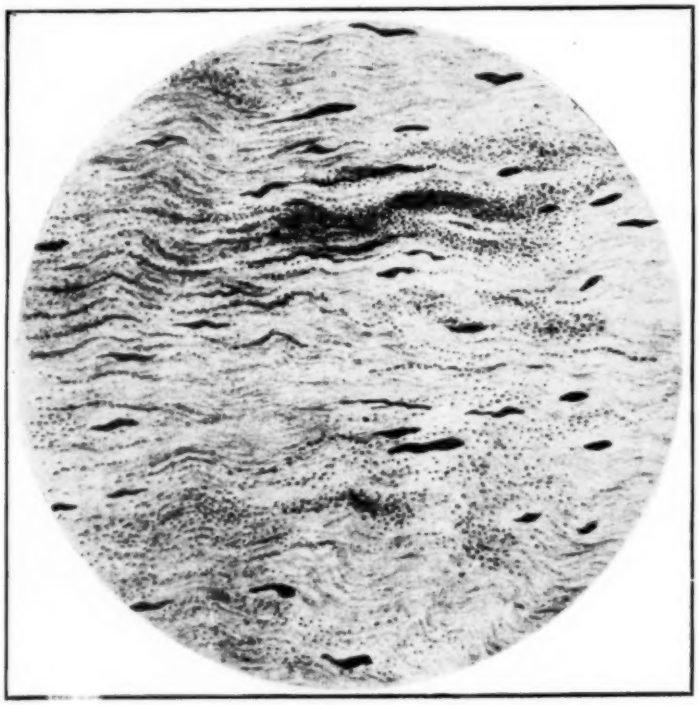

Fig. 2.—Section of cornea from Case 2. Granules in the corneal parenchyma.

Case 2. A 41 year old farmer. On January 18, 1916, his right eye was injured by a blow from a wooden plate. On account of pain and disturbed vision he sought the eye clinic on February 22nd.

*Present Condition*: A powerfully built man. Thorax and abdomen negative. Urine normal. Eye condition: Except for the slight opacity of the cornea the left eye appears normal. V=6/6. The right eye presents ciliary injection. The upper corneal half is tolerably grayish white, and above thru vascularization clearly red clouded. ocular pressure reduced. Vision only light perception. Projection poor.

*Clinical Diagnosis*: Macula cornea of the left eye. Traumatic iridocyclitis. Hyphema and blood infiltration of the cornea of the right eye.

*Course*: On February 22 (35 days after injury) the right eye was exenterated, and on May 13th he was discharged.

*Microscopic Examination*: The whole exenterated mass (cornea, uvea and vitreous) was, after fixation in 10 per cent formalin, washing, etc., imbedded in celloidin and cut in series. Only a

part of the vitreous was examined in teased preparations.

The vitreous in this case was entirely like that in the first, in that abundant granules were found. The different condition which especially surprised us was the contemporary existence of abundant socalled blood cell shadows. The last were mostly swollen, sometimes round, sometimes oval or pear-shaped, and appeared very pale from loss of hemaglobin. The remarkable condition which was met with in these blood cell shadows, was the occurrence of fine granules in them, which were not different in their tinctorial behavior or form from these free granules in the vitreous. The last condition shows most clearly that the granules lying free in the vitreous originate from the changed erythrocytes, blood cell shadows.

The most important condition, which surprised us in the cut preparation and which must be especially mentioned, is the contemporary occurrence of the peculiar granules in the cornea as characteristically demonstrated in the socalled blood infiltration of the cornea. One finds in the lower part of the cornea, where clinically a greenish brown orbicular opacity was observed, by greater magnification, abundant granules which stain rose red with eosin, violet red with Mallory's stain and deep blue with Heidenhain's iron hematoxylin. Their size is various from barely visible dust to about half the size of Koch-Weeks' bacilli. The larger types are rod shaped and mostly pointed on both ends. They lay for the greater part with their long axis parallel to the corneal lamellae. Otherwise in this part of the cornea there are no pathologic changes to be found; here one finds no hemorrhage, no new formation of blood vessels and no inflammatory cell infiltration. Descemet's membrane and the endothelium are likewise without change.

### TINCTORIAL BEHAVIOR OF GRANULES TO DIFFERENT STAINS

It is of the greatest interest to determine whether or not the free granules in the vitreous of the aforementioned cases behave the same tinctorially as the granules in the cornea, of the two cases which showed clinically the typical picture of the socalled blood infiltration of the cornea. I have placed the results of my investigation relative to this in table 1.

It is to be seen from this table that there is no doubt that the granules found in both of my cases in the vitreous, as well as in the cornea, behave tinctorially wholly the same.

Microchemical behavior of the granules in both cases. The following table shows the results of my investigation relative to this.

This result also shows the granules free in the vitreous behave the same chemically, as the granules in the cornea in socalled blood infiltration of the cornea.

After I have made clear thru the

TABLE I.

| Preparation | Case I. | Case II. | | |
|---|---|---|---|---|
| | | | Cut preparation. | |
| Stain. | Granules in Vitreous. | Granules in Vitreous. | Granules in Vitreous. | Granules in corneal parenchyma. |
| Hematoxylin (Römer) Eosin | rose red | rose red | rose red | rose red |
| Van Gieson | orange | orange | orange | not clear |
| Picric acid | yellow | yellow | yellow | not clear |
| Mallory's stain | sudan red | violet red | violet red | violet red |
| Iron Hematoxylin (Heidenhain) | deep blue | deep blue | deep blue | deep blue |
| Giemsa's stain | rose red | blue | blue | blue |
| Fibrin stain (Weigert) | ..... | violet | violet | not clear |
| Picrocarmin | ..... | light yellow | light yellow | not clear |
| Lithiocarmin | not stained | not stained | not stained | not stained |
| Muzicarmin | not stained | not stained | not stained | not stained |
| Sudan III | not stained | not stained | ..... | ..... |
| Amyloid stain (Methyl violet) | not stained | not stained | not stained | not stained |
| Amyloid stain (Jodin) | not stained | not stained | not stained | not stained |
| Cholesterin stain (Lugol) | not stained | not stained | not stained | not stained |
| Russel's hyalin stain | ..... | not clear | rose red | not clear |
| Unna Pappenheim's stain | ..... | not clear | not clear | not clear |
| Methylen blue (Loeffler) | ..... | blue | blue | blue |
| Bismarck brown | ..... | yellowish brown | yellowish brown | not clear |
| Pure cresyl violet | ..... | violet | violet | not clear |

existing analyses that the peculiar granules first found by me in the vitreous in both cases of traumatic vitreous hemorrhage originate from the changed red blood cells, blood shadows; and that they behave tinctorially and chemically the same as the granules in the cornea with the typical picture of socalled blood infiltration of the cornea, I am in a position to advance my own views of the so-called blood infiltration of the cornea and to criticise the prevailing views of the different authors on this question.

One asks if the previously widely accepted opinion is well grounded; namely, that the granules in the cornea in so-called blood infiltration of the cornea originate from the coloring matter released in the aqueous humor, and arise first thru the transformation of the latter from a soluble to an insoluble condition. This opinion appears reasonable insofar as the thus produced opacity of the cornea is colored a peculiar green. To this another explanation is admissible, which I will show later, that the existence of the granules in the cornea and the staining of the cornea can be proven to be due to two entirely different things.

The literature brings nothing for the sure proof that they develop from the hemoglobin. Kusama has explained them as melanosiderin of hematogenous origin, on the ground that the granules dissolved in concentrated hydrochloric acid and other strong depigmenting agents. Against this assumption is the temporary relation that the socalled blood infiltration of the cornea appeared about two weeks after the injury. In the case observed by Pincus it appeared three days after the injury. According to Golodetz and Unna it requires as a rule 6 to 7 weeks for the production of hemosiderin from hemoglobin and for the production of melanosiderin from hemosiderin a still longer time. Since the granules are entirely uninfluenced by sulphuric acid it is difficult to reconcile this assumption as melanosiderin is soluble in this acid. The color of these granules is not in favor of this assumption as they show no dark brown color. I am inclined to believe that the assumption of the hemaglobin nature of these granules requires further proof.

My results are that:

(1) Abundant fine round granules appear in the vitreous in cases of traumatic hemorrhage into the vitreous.

(2) That the granules in question originate from changed red blood cells, the so-called blood cell shadows.

(3) Finally that these granules in the vitreous and the characteristically demonstrated granules in the cornea, in the

TABLE II.

| Preparation— | | Case I. | Case II. | | |
|---|---|---|---|---|---|
| | | | | Cut preparation. | |
| Reagent. | Time period. | Granules in Vitreous. | Granules in Vitreous. | Granules in Vitreous. | Granules in corneal parenchyma. |
| 10° hydrochloric acid | 24 hrs. | insol. | insol. | insol. | insol. |
| 10° sulphuric acid | 24 hrs. | insol. | insol. | insol. | insol. |
| 10° nitric acid | 24 hrs. | insol. | insol. | insol. | insol. |
| Acetic acid | 72 hrs. | insol. | insol. | insol. | insol. |
| Pure HCl, sp. g. 1,9 | 10 min. | insol. | insol. | insol. | insol. |
| Pure nitric acid | 10 min. | insol. | insol. | insol. | insol. |
| Pure sulphuric acid sp. g. 1,84 | 10 min. | insol. | insol. | soluble | soluble |
| Pure hydrochloric acid, sp. g. 1,9 | 24 hrs. | soluble | soluble | soluble | soluble |
| 1° caustic potash | 24 hrs. | soluble | soluble | soluble | soluble |
| 1° caustic potash | 10 min. | insol. | insol. | insol. | insol. |
| 0.1° caustic potash | 24 hrs. | insol. | insol. | insol. | insol. |
| Ammonia | 24 hrs. | insol. | insol. | insol. | insol. |
| Acid-alcohol | 24 hrs. | insol. | insol. | insol. | insol. |
| Alcohol | 24 hrs. | insol. | insol. | insol. | insol. |
| Ether | 24 hrs. | insol. | insol. | insol. | insol. |
| Chloroform | 72 hrs. | insol. | insol. | insol. | insol. |
| Water | Several days | insol. | insol. | insol. | insol. |
| $H_2 O_2$ | 7 days | partly soluble | partly soluble | partly soluble | partly soluble |
| Pot. permanganat and oxalic acid | 7 days and 30 min. | soluble solution | soluble | soluble | soluble |
| 0.5° Trypsin | 24 hrs. | insol. | insol. | insol. | insol. |
| Iron reaction (Berlin blue) | .... | negative | negative | negative | negative |
| Iron reaction (Ammonium sulphid) | .... | negative | negative | negative | negative |
| Haemin crystal formation | .... | .... | negative | .... | .... |

socalled blood infiltration of the cornea behave exactly the same tinctorially and chemically.

These observations force us to the conclusion that the granules in the cornea, in the socalled blood infiltration, arise from the erythrocytes themselves; and are not formed in loco but rather in some other segment of the eye and from there as such conveyed to the cornea. By this it is naturally not meant that the granules in the cornea pass directly from the vitreous to the cornea. Even if I did not find in both my cases the same granules in the anterior chamber as they were found in the vitreous, it is very reasonable that they occurred there at one time; as in the socalled blood infiltration of the cornea hyphema of the anterior chamber is a never failing condition.

It is very remarkable that the contents of the anterior chamber in socalled blood infiltration of the cornea have previously very rarely been the object of investigation. I find in the literature on this only the communications of Engel and Kagoshima. Both these authors have in their investigations directed their chief aim to the blood coloring matter, without giving sufficient attention to the morphologic changes of the contents. However, Engel mentions the occurence of fine granules and blood shadows in the anterior chamber, without attributing any special importance to them. I consequently believe, at first in the socalled blood infiltrations of the cornea, peculiar granules develop from the blood cell shadows in the anterior chamber and these as such are further displaced into the cornea to produce the complete picture of the socalled blood infiltration of the cornea. The eventual infiltration of the cornea The eventual difference in the outer form which I found in my two cases, between the fine granules in the vitreous and the granules in the cornea. I may consider as an unsubstantial one; as the granules in the cornea were of many shapes and manytimes in the literature described not as spindle shaped as in my two cases, but more as round in shape.

The questions, as to how much and under what conditions such granules develop from erythrocytes and how they are transported from the anterior chamber to the cornea are difficult to answer, and will be retained for further investigations. The rare occurrence of the socalled blood infiltration of the cornea, as compared to traumatic hemorrhage in the anterior chamber, permits us to conjecture that the physiologic path of the aqueous diffusion hardly comes into consideration as Roemer and Treacher Collins assume.

Finally I would like to present a question, whether one is justified to view all hitherto reported cases in regarding blood infiltration as a uniform change. When one reviews the literature pertaining to this he will be immediately surprised that the color of the corneal opacity is so differently described. It is mentioned for example as almost red brown (Vossius, Treacher Collins, Pincus, v. Barley, Meissner), almost greenish brown, (Vossius, Hirschberg, Richter, Laas, Kusama), almost yellowish green, (O. Scheffels, Kayser, v. Barley, Buchanan). The microscopic condition is by no means the same because one series of authors (Vossius, Michel) found only granules with a positive iron reaction, whereas the others found only the same with a negative iron reaction (Baumgarten, Vossius, Nishimura), or both kinds of granules were mixed therein (Vossius, Treacher Collins, Römer, Löhlein, Kusama.)

All this makes it reasonable that the socalled blood infiltration of the cornea presents neither a clinical nor a histologic uniform change. On account of this the following briefly reported case lays claim to special interest as it, in spite of the beautiful greenish yellow color of the cornea, presented histologically no positive granule condition, and as such stands alone.

### CASE OF GREENISH YELLOW STAINING OF CORNEA.

The case concerned a 16 year old boy, who in 1911 had both eyes operated for high grade myopia, complicated by cataract. At the end of Nov. 1915 weakness of the right eye occurred, which gradually increased, and in Feb. 1916 caused him headache and vomiting associated with redness. Since this time a yellowish

green color of the cornea of this eye has become noticeable. On May 22nd he was received at the clinic. At that time the following history was obtained:

The pronounced signs of congenital lues. Nervous system free. Urine negative. Both eyes are large and somewhat exophthalmic. The right eye is irritated nd pericorneally injected. The cornea of this eye is of normal size, shape and curvature, is provided with many deep lying vessels and is distinctly yellowish in color. This opacity is orbicular and darker in the middle. The anterior chamber is of normal depth, clear and contains no hyphema. Iris atrophic. The pupil is almost maximally dilated, free from synechiae and totally rigid. Vision light perception. (Uncertain projection) T. —. The left eye is free from irritation. Cornea, anterior chamber and iris are without change. In the pupillary region secondary cataract membrane. The fundus shows nothing particularly in myopic changes. Vision, fingers at 3 feet and with —3. V=6/24. Tension normal.

The right eye was enucleated and fixed in 10 percent formalin.

The histologic examination of the cornea of this eye was, contrary to my expectation, entirely negative: instead of a typical clinical picture of corneal blood infiltration there were no granules to be found. In the gelatinous, greenish yellow mass, which completely filled the vitreous cavity one could point out neither blood cell shadows nor granules. Dr. M. Tomita, the assistant of the medico-chemical institute, was able at my request to extract from this vitreous mass an alcohol soluble substance, which gave a beautiful Gmelin's reaction.

This case shows clearly that the clinical picture of socalled blood infiltration of the cornea can arise without the appearance of granules in the cornea. There is here a single assumption admissible, that the coloring of the cornea is caused by the coloring matter of the blood which is forced into the cornea along the path of diffusion. This case shows most clearly, contrary to the previously ruling opinion, that the existence of granules in the cornea and the peculiar staining of the cornea in the socalled blood infiltration in the cornea and the peculiar staining of the cornea in socalled corneal blood infiltration can sometimes imply two utterly different conditions.

## CONCLUSION.

(1) In one case of old traumatic hemorrhage of the vitreous, which appeared dark green by oblique illumination, abundant small granules were found histologically in the vitreous.

(2) In another case of traumatic hemorrhage of the vitreous and anterior chamber, with typical blood infiltration of the cornea, the same granules were found in the vitreous as in the first case and in the parenchyma of the cornea, the same granules previously variously described as characteristic for the socalled corneal blood infiltration.

(3) The two types of granules behave the same toward different stains and chemical reagents.

(4) The two types of granules should therefore be probably identical.

(5) If this assumption is correct, it is probable, that the granules in the parenchyma of the cornea in socalled corneal blood infiltration are not formed in loco, but produced in some other place and as such carried to the cornea.

(6) The granules found in the vitreous are not alone abundantly free but also often contained in the blood cell shadows. This proves that the granules probably arise from the blood cell shadows.

(7) From aforementioned 5 and 6 it follows that the previously prevailing view that the granules in the corneal parenchyma, in socalled blood infiltration of the cornea, develop by the conversion of the free blood coloring matter in the anterior chamber to a combined state, is untenable. The remaining assumptions which search for the site of the development of the granules in the cornea itself are, according to my opinion, just as little plausible.

(8) By which path the granules, formed from red blood cells in the vitreous and in the anterior chamber enter the cornea is not clear.

(9) For the completion of the picture

of socalled blood infiltration of the cornea the existence of the granules previously described as characteristic in the cornea is not necessary. There is a type of case in which the staining of the cornea is caused exclusively by freed blood coloring matter. The typical staining of the cornea and the existence of granules can therefore possibly have to do with two utterly different things.

In conclusion I express my heartfelt thanks to Prof. K. Ichikawa for the possession of the material and for the kindly suggestion for this work.

## EARLY DIAGNOSIS OF PITUITARY TUMOR WITH OCULAR PHENOMENA.

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ROCHESTER, MINN.

This paper from the Section on Ophthalmology of the Mayo Clinic is based on the analysis of cases seen there. Altho the final diagnosis may rest on other grounds, the ocular findings should awake suspicion and direct attention to their real cause. They may also determine the question of operative treatment. Presented before the Section on Ophthalmology of the A. M. A. April 29, 1920, and published here by courtesy of the Journal of the A. M. A.

The marked advance in surgical therapy of pituitary disorders made during the last few years has been due in large part to the greater certainty with which tumors of the hypophysis have been diagnosed, and to the fact that such a diagnosis could be made early in the course of the disease. The physiologic phenomena as well as the gross structural changes and irregular organic development due to secretory derangements do not demand the radical treatment that failing vision does; and altho pituitary disorders in such conditions are frankly present, they have little interest for the surgeon.

The experience of a few years has been sufficient to define the field of surgical therapy in pituitary disorders and to demonstrate the value of operative procedures in pituitary tumors that result in ocular phenomena from involvement of the chiasm and the optic tracts. Tumors of the hypophysis can be reached and often removed under conditions that allow close inspection of the sella and surrounding structures, so that much of the uncertainty which accompanied decompression has been dispelled. With the greater likelihood of complete removal of the tumor and a better prognosis, there will be less hesitancy on the part of the surgeon to undertake the operation, and a greater willingness on the part of the patient to undergo the risks involved.

Ocular changes constitute the chief symptom in a large number of pituitary tumors, and are often our only means of identifying the condition (Table 1). The ocular phenomena associated with pituitary tumor consist in contracted fields, lowered visual acuity, and changes in the ophthalmoscopic picture of the nerve heads that have been referred to as optic atrophy, and which are the results of pressure on the optic tracts in the region of the chiasm.

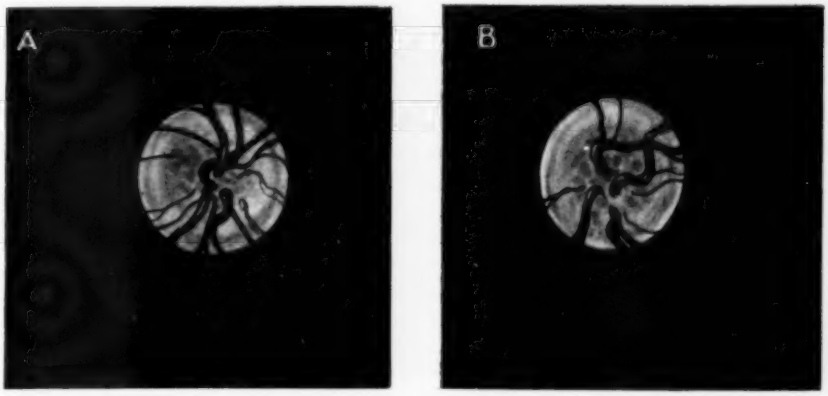
The rapid advancement of surgical therapy in pituitary tumor makes desirable early diagnosis, and the diagnosis can often be made before constitutional symptoms of the disease are developed. A great number of such cases will first be seen and should be recognized by the ophthalmologist. The increasing number of pituitary tumors reported seems to indicate that more attention is being directed toward recognition of this condition; but I am convinced that more detailed examination of patients who complain of headache, lowered visual acuity that cannot satisfactorily be improved by glasses, drowsiness, and inability to concentrate on mental work will lead to early rec-

TABLE 1—OCULAR PHENOMENA IN THIRTY-TWO SELECTED CASES OF PITUITARY TUMOR.

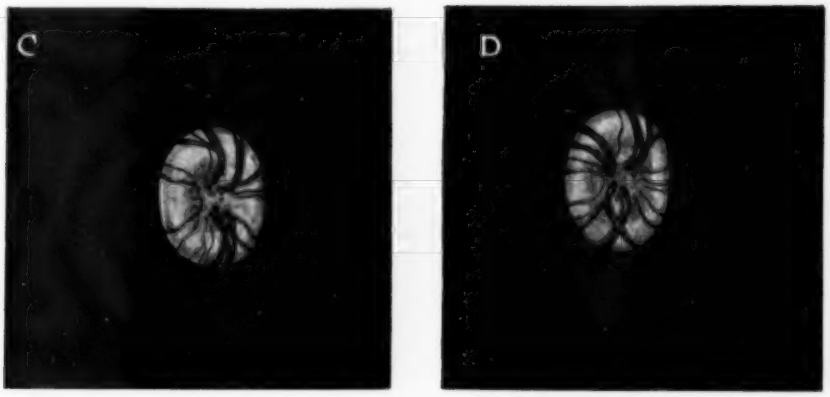
| Case | Age | Sex* | Constitutional Evidences of Pituitary Disease | Condition of Sella Roentgenogram | Fields | Condition of Discs |
|---|---|---|---|---|---|---|
| 207279 | 42 | ♂ | None | Normal | Bitemporal hemianopsia | Pallor |
| 270734 | 48 | ♀ | Central nervous system negative | Normal | R. Temporal contraction | Pallor |
| 250408 | 41 | ♀ | None | Normal | Bitemporal hemianopsia | Normal |
| 254897 | 38 | ♂ | None | Normal | Bitemporal hemianopsia | Normal |
| 207683 | 28 | ♀ | None | Normal | R. Temporal contraction | Pallor |
| 295780 | 49 | ♀ | Metabolic rate —23, suggestive of myxedema | Normal | L. Temporal contraction | Pallor |
| 265097 | 28 | ♂ | None; sellar decompression 15 months before | Enlarged | Bitemporal hemianopsia | Atrophy |
| 201188 | 50 | ♀ | None | Enlarged | Bitemporal hemianopsia | Pallor |
| 234782 | 38 | ♀ | Headaches; central nervous system negative | Enlarged | Bitemporal hemianopsia | Normal |
| 239742 | 26 | ♂ | None | Enlarged | R. Homonymous hemianopsia | Pallor |
| 253290 | 28 | ♂ | Metabolic rate +19; acromegaly 8 years | Enlarged | Bitemporal hemianopsia | Pallor |
| 210605 | 38 | ♀ | Acromegaly 5 years | Enlarged | Temporal contraction | Normal |
| 219123 | 9 | ♀ | None | Partial destruction | R. homonymous hemianopsia | R. hyperemia choked disc, L. |
| 201329 | 60 | ♂ | None | Partial destruction | R. Temporal hemianopsia L. Contraction | Pallor |
| 204823 | 49 | ♂ | None | Partial destruction | L. hemonymous hemianopsia | Pallor |
| 205813 | 53 | ♂ | None | " | R. Temporal hemianopsia | Atrophy |
| 45560 | 36 | ♀ | Cessation of menstruation 12 years ago | " | L. Temporal hemaniopsia | Atrophy R. pallor L. |
| 236675 | 29 | ♀ | Cessation of menstruation 4 years ago | " | Bitemporal hemianopsia | Normal |
| 271683 | 33 | ♀ | Decompression for pituitary 5 years | " | Bitemporal hemianopsia | Pallor |
| 25558 | 52 | ♀ | Gain in weight; drowsiness for 2 years | " | Bitemporal hemianopsia | Pallor |
| 257278 | 54 | ♀ | None; central nervous system negative | Partial destruction | Bitemporal hemianopsia | Pallor |
| 248126 | 29 | ♂ | Metabolic rate —10; cent. nervous system neg. | Partial destruction | Bitemporal hemianopsia | Pallor |
| 268798 | 42 | ♀ | General exam.; cent. nervous system neg. | Partial destruction | Bitemporal hemianopsia | Pallor |
| 293423 | 31 | ♀ | History inconclusive | Partial destruction | Bitemporal hemianopsia | Pallor |
| 288874 | 32 | ♂ | Metabolic rate —8 | Partial destruction | Bitemporal hemianopsia | Pallor |
| 216363 | 33 | ♂ | None | Complete destruction | L. Temporal hemianopsia | Atrophy R., hyperemia left eye |
| 253633 | 43 | ♂ | None | Complete destruction | Bitemporal hemianopsia | Pallor |
| 262796 | 51 | ♂ | None | Complete destruction | Contraction (both), L. Temporal hemianopsia | Atrophy |
| 245366 | 36 | ♂ | Acromegaly | Complete destruction | Small triangle in fourth Quadrant R. | Pallor |
| 251151 | 42 | ♀ | None | Complete destruction | R. Temporal hemianopsia | Atrophy |
| 274037 | 60 | ♀ | None; central nervous system negative | Complete destruction | R. Temporal contraction | Pallor |
| 35174 | 50 | ♀ | Metabolic rate —19; cent. nervous system neg. | Complete destruction | Bitemporal hemianopsia | Pallor |

General and central nervous system examinations negative ..... 23
Acromegaly ..... 3
Menstrual disturbance, marked hypopituitarism, previous operation ..... 6

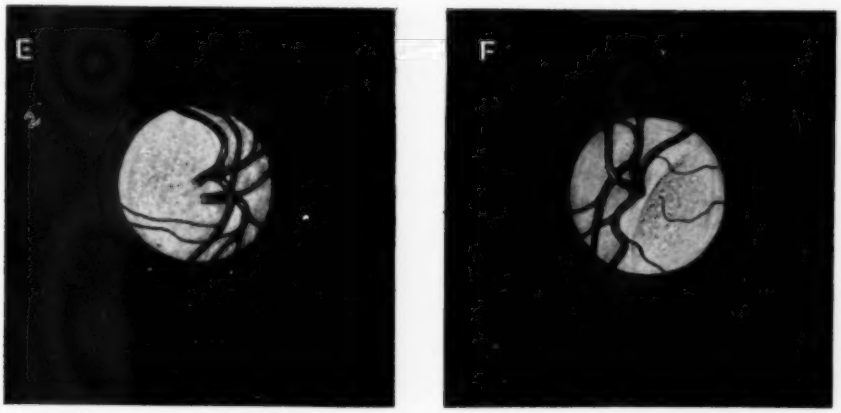
*In this column, male is designated by ♂ and female by ♀.




PALLOR OF DISC WITHOUT ATROPHY IN A CASE OF PITUITARY TUMOR. A. (RIGHT). B. (LEFT).




PALLOR OF DISC WITHOUT ATROPHY IN A CASE OF PITUITARY TUMOR C. (RIGHT). D. (LEFT).




PRIMARY OPTIC ATROPHY. E. (RIGHT). F. (LEFT).

ognition of the cases which now frequently remain unrecognized until constitutional evidences of pituitary disease become manifest. The frequent absence of constitutional disorders, and the negative findings on examination of the central nervous system except for ocular disorders, place the case squarely in the hands of the ophthalmologist. The slow loss of visual acuity, the gradual and progressive narrowing of the visual field, as described by Josephson,[1] in a manner that is largely characteristic of the disease, and the appearance of the nerve head in the fundus constitute the only measurable factors that are concerned in the progress of the lesion, and furnish the basis for diagnosis, treatment, and prognosis.

### VISUAL ACUITY.

I shall not attempt to review the literature here nor to compare results of examination with those of other investigators but shall point out the important items gained from a study of thirty-two cases examined at the Mayo Clinic. Lowered visual acuity of one or both eyes was a symptom in every case examined; lowered acuity in one eye with 6/6 or better in the other eye was noted in five. The onset of visual disturbance was usually gradual. In Case 207279 there is good reason to believe that the vision began to fail in the right eye because of pituitary tumor nineteen years before examination in the clinic, and in the left eye four years before. One patient (Case 253290) stated that the vision of the left eye failed suddenly after two years of acromegaly. Six years later he still retained ability to count fingers with that eye. Six patients had no light perception in one eye, but retained some vision in the other eye.

Near vision as well as distance vision is usually affected, and only rarely will glasses improve it. In the cases of this series there was little change in visual acuity from day to day or month to month, except a steady failure in the progressive cases. Rapid changes were sometimes found, particularly in the visual fields, and it was often necessary to average a series of successive charts to appreciate the general trend of contraction.

### FIELDS OF VISION.

The character of the field is determined by the size and position of the tumor. The field will vary with the growth of the mass and with variations in pressure at the chiasm. Probably the most characteristic field is that showing bitemporal hemianopsia, or homonymous hemianopsia, altho frequently only one quadrant is greatly affected. The progressive limitation of peripheral vision has been adequately described by Cushing and Walker.[2] The cases fall naturally into three groups: (1) those with bitemporal hemianopsia; (2) those with homonymous hemianopsia, and (3) those with no light perception in one eye and with temporal defect in the other eye. In the first class were twenty cases, in the second two, and in the third, ten. There were no cases with nasal hemianopsia in one eye and blindness in the other. Several of the ten patients in the third group stated that their vision had failed in the temporal side first; others did not know the manner in which the field was lost.

The change in the character of the field as well as the visual acuity may be altered by conditions that materially change the pressure in the region of the chiasm. A decompression at the side of the head or at the sella will give temporary increase of visual acuity as well as increase of the size of the field. Veasey[3] reported temporary increase of vision in a blind temporal field after the administration of amyl nitrit. In Case 250408 of this series there was temporary increase of vision after an operation for suppurative sinuitis.

CASE 250408.—Mrs. P., aged 41, came for examination, Nov. 8, 1918, complaining of progressive failing vision which had begun three weeks previously. The eye history up to that time had been negative. The failure in vision was not accompanied by pain or headache. The general history was negative except that the patient had passed through the menopause at the

age of 36. Examination revealed the eyes to be normal in position, the lids, conjunctivae and corneas clear; the pupils, which were equal and round, reacted normally to direct and consensual light stimulation and in accommodation. Ophthalmoscopic examination revealed the media to be clear, the disks slightly oval, long axes vertical, margins well defined, and the nerve heads pale pink without swelling or shrinkage of the nerve substance. There was no change in the retinal circulation or other lesion of the fundus. Vision in the right eye was 6/30; in the left, 6/15. The fields showed bitemporal hemianopsia. The field in the right eye was cut squarely thru the macular region, and in the left eye the temporal field encroached within 5 degrees on the horizontal meridian. A roentgenogram of the head revealed a normal sella turcica, but a large calcified pineal body. There were many bad roots in the jaw. The tonsils were moderately enlarged and contained fluid pus; the nasal septum was deviated to the right, causing almost complete obstruction. There were polyps in both middle meatuses, and there was much pus in the left nostril.

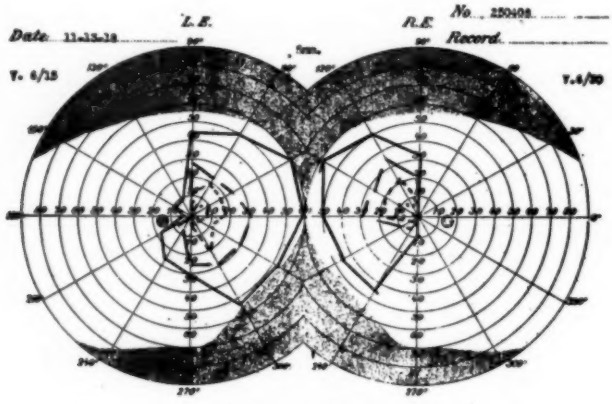



Fig. 1.—(Case 250408). Visual fields, Nov. 13, 1918.

Nov. 15, 1918, a submucous resection of the nasal septum was done (Lillie) and the nasal polyps were removed. The ethmoids were not exenterated. November 18, the patient volunteered the information that she could see much more to the side than previously, and that her vision was much clearer. Examination on that day revealed vis-

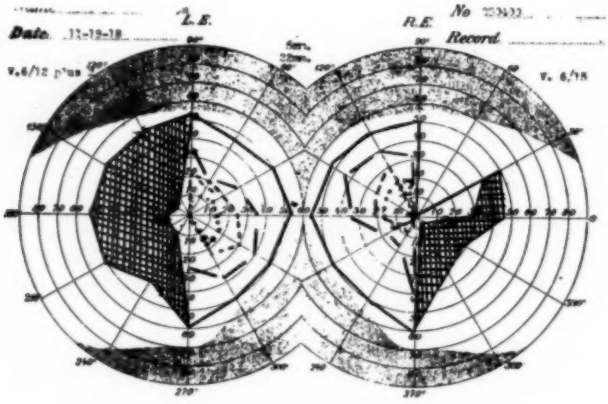



Fig. 2.—(Case 250408). Visual fields, Nov. 18, 1918.

ual acuity of the right eye to be 6/15, of the left 6/12 plus 2. The field of the right eye was increased to between 30 and 50 degrees in the lower outer quadrant, and the field in the left eye was increased uniformly to 50 degrees. This increase in the fields was merely a relative increase, showing with a 22 mm. test object at 290 mm., but not found when the 5 mm. test object was used. November 23, the patient had a pan sinus exenteration (right side). "The middle meatus and ethmoid labyrinth were filled with pus and hyperplastic tissue. The ethmoid labyrinth gave the sensation of brittleness and was entirely exenterated. The sphenoid was entered and found to be not affected. The antrum was irrigated and foul pus removed" (Lillie). November 27, the patient stated that she could see to read. The fields taken on that day, however, showed no improvement; in fact, some of the relative fields in both eyes had been lost between the last two operations. No further sinus operations were necessary. The vision had now improved to 6/12 in the right eye and 6/10 in the left. December 18, the relative field with 22 mm. test object at 290 mm. was narrow, and the patient had almost complete bitemporal hemianopsia with 6/12 vision in the right eye and 6/7 in the left. Feb. 19, 1919, she had complete bitemporal hemianopsia, with the fields divided vertically just to the temporal side of the point of fixation.

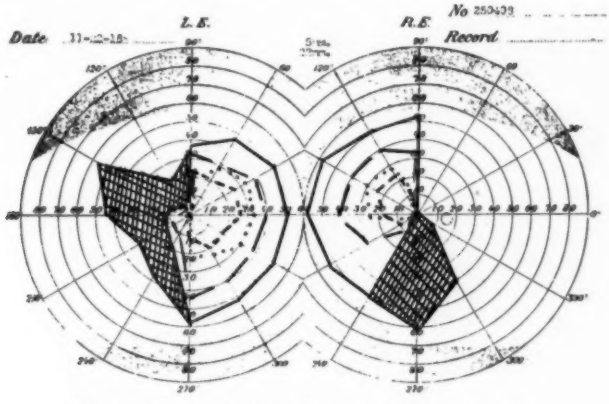



Fig. 3.—(Case 250408). Visual fields, Nov. 22, 1918.

The improvement in vision and in fields in this case was only temporary, and altho the visual acuity remained good, the fields resumed the form char-

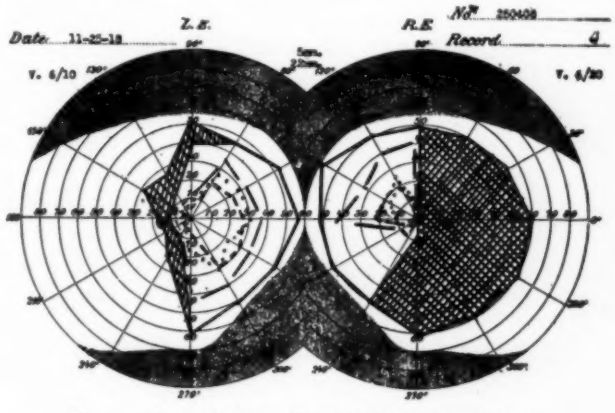



Fig. 4.—(Case 250408). Visual fields, Nov. 25, 1918.

acteristic of pituitary tumor. The greatest improvement was noticed immediately after any operation or manipulation about the nose which would temporarily increase the circulation to the nasopharynx (Charts 1-10).

So much depends on the form of the field found that the importance of careful field taking cannot be overemphasized. We have not found it possible to resort to the intensive painstaking methods of Walker,[4] nor do I believe it necessary. Field examinations that require more than half an hour are likely to be unreliable because the patient tires of the process and answers incorrectly. Examinations were made on succeeding days under varying lighting conditions, time of day, and weariness of the patient.

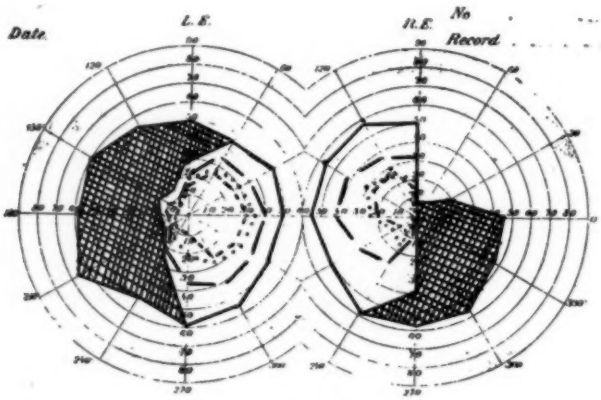



Fig. 5.—(Case 250408). Visual fields, Nov. 29, 1918.

APPEARANCES OF NERVE HEAD.

(See Plate VII, p. 572.)

One of the most important ocular changes brought on by pituitary tumor is the appearance of the nerve head as seen with the ophthalmoscope. A peculiar waxy pallor of the nerve without shrinkage is seen so often that it has become practically a diagnostic feature. The pallor is not due to atrophy of the optic nerve, unless vision has been destroyed almost entirely for a considerable length of time, and it is accompanied by an atrophic excavation of the disc, such as is seen in atrophy of tabes and toxic neuritis. In the atrophy of tabes, the pallor of the disc, the loss of vision and the shrinkage of the nerve itself progress together; if

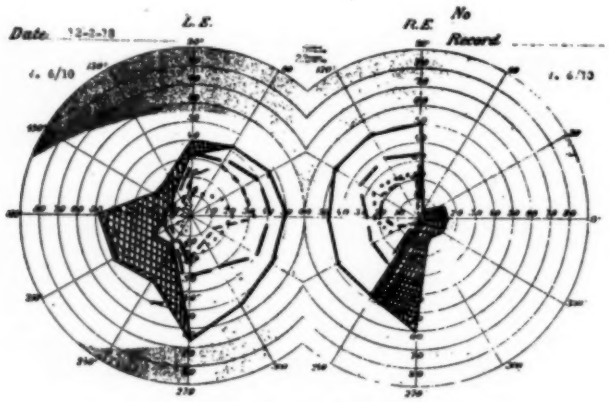



Fig. 6.—(Case 250408). Visual fields, Dec. 2, 1918.

any difference is found, the vision often seems too good for the extent of pallor and excavation of the disc seen with the ophthalmoscope. In toxic neuritis, the vision fails first; the shrinkage of the nerve and the pallor of the disc follow together. In the case of pressure at the chiasm from pituitary or other tumor, the appearance of pallor of the disc may not be noticeable for years after the onset of the loss of vision. The pallor is not accompanied by shrinkage of the nerve substance or atrophic excavation. Visual acuity may be 6/6 or better in an eye with a blind temporal field. The disc may be quite pale, but there is no appearance of swelling or shrinkage of the nerve head. The disc margins are well defined. The physiologic cup is not altered in size or shape. The nerve substance itself is pale, but otherwise not noticeably changed. The pallor of the nerve head without loss of substances is the characteristic ophthalmoscopic feature of chiasmal pressure, and serves as a basis for estimating the probability of recovery of vision. The nerve head usually is a waxy yellow, with no elevation, and no changes in relation to disc margins or lamina cribrosa. The great vessels are not altered. Only the small vessels that give the nerve head its usual pink color are obliterated. The pallor is usually evenly distributed over the disc, that is, there is no disproportionate pallor of the nasal side of the disk even in the course of temporal hemianopsia of long standing, altho in the eyes which normally have a temporal pallor, this difference in color between the nasal and temporal

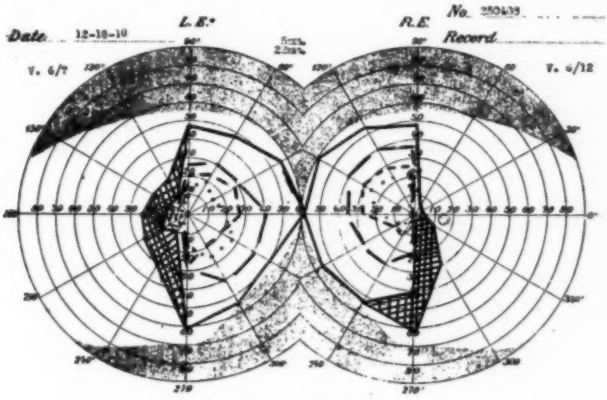



Fig. 7.—(Case 250408). Visual fields, Dec. 18, 1918.

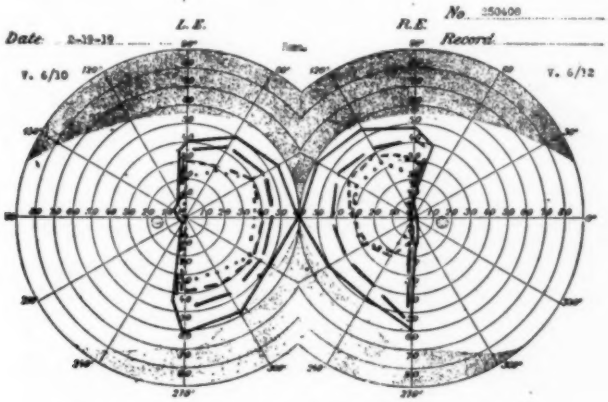



Fig. 8.—(Case 250408). Visual fields, Feb. 19, 1919.

sides of the disc may be accentuated. This is quite in keeping with the pathologic findings of Walker and Cushing, who record that "despite the socalled atrophic pallor of the disc in patients having visual field defects resulting from lesions in the chiasmal regions, of diminished vision with field changes for three years, one for six months, and the other three for from only three to twelve weeks. In the greater number of cases, pallor of the disc may be expected to appear about the fourth month after the onset of visual symptoms. The longer the duration of visual disturbances before the appearance of disc pallor, the greater is the probability that a tumor is present which is slow growing. Atrophy of the optic nerves following shortly after the onset of visual changes indicates pressure rapidly produced, or pressure accompanied by processes that lead to early destruction of the optic tract. Since rapidly developed pressure is more likely to result from malignant tumor or cysts than from benign types of

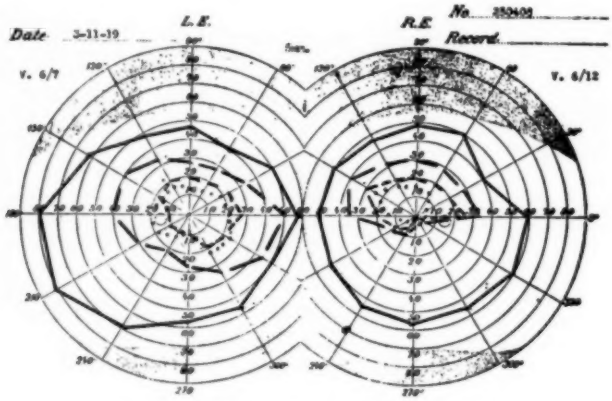



Fig. 9.—(Case 250408). Visual fields, March 11, 1919.

the histologic examination of the nerves fails to show the expected degree of fiber degeneration unless the progress has been of long duration."

What of the duration of visual symptoms of tumor before a pallor of the nerve head can be distinguished with the ophthalmoscope, and before the disc changes characteristic of true atrophy develop? Five of our patients had no appreciable change of the disc at the time of examination. One patient (Case 236675, Group 3) gave a history

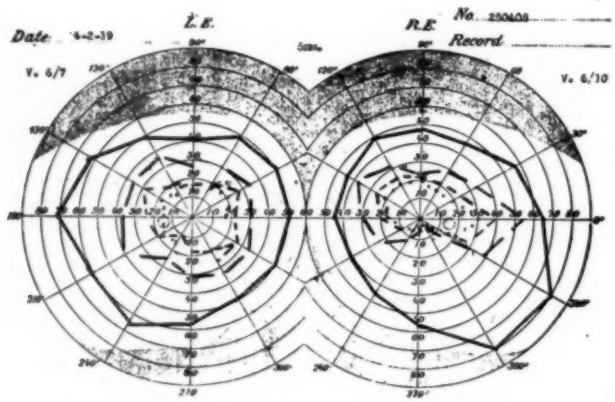



Fig. 10.—(Case 250408). Visual fields, April 2, 1919.

tumors, the prognosis in cases of beginning atrophy must be guarded. Optic atrophy of both eyes that finally ensues after long duration of visual symptoms will not be improved materially by removal of the pressure, so that the prime object to be attained by the operation is beyond reach, and operation for visual purposes should not be undertaken. The chief object, then, of the ophthalmoscopic examination is has the nerve undergone atrophy. The visual acuity and visual fields may not help in the prognosis in cases of low vision, and it must be determined by the amount of atrophic shrinkage alone whether the nerve will be in a condition to resume function when the cause of the pressure has been removed (Table 2).

Choked disc and neuritis were encountered in only one case.

CASE 219123.—A girl, aged 9, had had diabetes insipidus at the age of 5. Some twenty-four hour records showed that from 3 to 4 quarts of urine were passed daily; since then she had a tendency to drink freely at night and pass considerable urine, but not constant in degree. In October and November, 1917, she had an attack of mild headache with malaise lasting for from three to four days, during which time she vomited persistently and practically lost her vision in the right eye. Improvement followed in a few days. In December, the patient had another attack of vomiting, with malaise the following week. Jan. 1, 1918, she was blind in the left eye.

Examination revealed vision in the right eye to be 6/6; in the left, light perception. Direct light reflex was lost in the left eye, but was present in the right. The consensual reflex of the right pupil was lost; it was present in the left; convergence contraction was present in both. Examination of the fundus of the right eye showed the disc to be small, with a hazy margin; the nerve head was hyperemic, and the veins were tortuous; examination of the fundus of the left eye showed the nerve head to be swollen 2 diopters, and the veins tortuous. No hemorrhage was found in either eye. There was a temporal hemianopsia of the right eye, and indeterminate light perception somewhere in the temporal field of the left eye, indicating that

TABLE 2.—RELATION OF OPHTHALMOSCOPIC APPEARANCE OF THE NERVE HEADS AND DURATION OF VISUAL SYMPTOMS.

| Case | Condition of Discs | Duration of Visual Symptoms | Condition of Sella in Roentgenogram | Pathologic Diagnosis |
|---|---|---|---|---|
| 250408 | Normal | 3 weeks | Negative | Carcinoma |
| 254897 | Normal | 4 months, right; 5 months, left | Negative | Cyst |
| 234782 | Normal | 6 months; blindness 1 month; sight suddenly returned | Enlarged | Epithelioma |
| 210605 | Normal | 5 weeks, left | Enlarged | Malignant tumor |
| 236675 | Normal | 3 years | Enlarged with clinoids eroded | Glioma |
| 265097 | Atrophy | 20 months | Enlarged | Carcinoma |
| 205813 | Atrophy | 5 years; blind 6 months | Enlarged with clinoids eroded | No operation |
| 216363 | Atrophy (right eye) | 2 years; blind 2½ years (right eye) | Complete destruction | Malignancy |
| 262796 | Atrophy | 15 years, left; 1 year, right | Complete destruction | Gliosarcoma |
| 251151 | Atrophy | 4 years | Complete destruction | No operation |
| 45560 | Atrophy | 4 years, right; blindness 1 year; 10 days, left | Enlarged with clinoids eroded | Malignancy |
| 219123 | Choked Disc (left eye) | 4 months, left; blindness 1 month | Partial destruction | Malignant tumor |

there had been a right homonymous hemianopsia. At operation a "pituitary tumor was found situated underneath the optic commissure and left optic nerve elevating both. The growth was about 1.75 cm. in diameter. It had originated from the pituitary gland in the sella turcica and was extremely adherent to all the surrounding structures and without a definite line of demarcation. In two places the growth had broken thru the thin capsule over the tumor. It was necessary to drain the right ventricle on account of increased pressure, and about 1 ounce of grayish fluid was removed" (Adson). The tumor was reported by the pathologist to be malignant.

The choked disc in this case was evidently due to the increased pressure within the ventricles, which is a complication rarely encountered.

ROENTGENOGRAPHY.

Roentgenography of the head with especial attention to changes in the configuration of the sella turcica is of value in determining the extent of the damage to neighborhood structures and, as changes in the sella are commonly found to exist in pituitary tumor, it adds important evidence of the presence of such a tumor. It is well known that enlargement of the sella, however, and even destruction of certain of its parts may result from other intracranial disorders. Likewise, a pituitary tumor of some size may be present and cause characteristic ocular phenomena without in any way changing the sella so as to make it appear abnormal by roentgenographic inspection. Six of our group of cases showed no sellar changes. Two of these patients had a "calcified pineal gland." The changes in the sella revealed by roentgenogram may be placed in four large groups: (1) no enlargement of the sella nor erosion of the base or clinoid processes (Table 3); (2) enlargement of the sella without erosion or destruction of bone (Table 4); (3) enlargement of the sella with thinning of the base and erosion of the clinoid processes (Table 5), and (4) complete destruction of the sella (Table 6).

The following are histories of cases tabulated in Table 3, Group 1, in which a diagnosis of pituitary tumor was made on the eye findings alone.

CASE 207279.—Mr. W., aged 42, a bank cashier, came to the clinic, Sept. 5, 1917, complaining of failing vision in both eyes. Before 1900 he found he was not reading with the right eye. He procured glasses, but vision in the eye

TABLE 3.—GROUP 1: CASES WITH NORMAL SELLA SHOWN IN ROENTGENOGRAM.

| Case | — Vision — Right Eye | Left Eye | Visual Fields | Pathologic Diagnosis |
|---|---|---|---|---|
| 207279 | C. f.* | 6/15 | Bitemporal hemianopsia | Cellular fibroma |
| 270734 | 6/15 | Nil | Temporal contraction (right eye) | Epithelioma |
| 250408 | 6/30 | 6/15 | Bitemporal hemianopsia | Carcinoma |
| 254897 | 6/30 | 6/30 | Bitemporal hemianopsia | Cyst |
| 207683 | 1/60 | Nil | Temporal contraction (right eye) | Sarcoma |
| 295780 | | L. p.† | Temporal contraction (left eye) | No operation |

* Counts fingers.
† Light perception.

TABLE 4.—GROUP 2: CASES WITH ENLARGED SELLA SHOWN IN ROENTGENOGRAM.

| Case | — Vision — Right Eye | Left Eye | Visual Fields | Pathologic Diagnosis |
|---|---|---|---|---|
| 265097 | 1/60 | 5/60 | Bitemporal hemianopsia | Carcinoma |
| 201188 | 6/12 | C. f. | Bitemporal hemianopsia | Carcinoma |
| 234782 | 6/60 | C. f. 17 cm. | Bitemporal hemianopsia | Epithelioma |
| 239742 | C. f. | 6/6 | Homonymous hemianopsia (right eye) | No operation |
| 253290 | 6/10 | C. f. | Bitemporal hemianopsia | Sarcoma |
| 210605 | 6/7 | C. f. | Temporal contraction (left eye) | Malignant tumor |

was not improved. About 1913 or 1914, he noticed contraction of the visual field of the right eye, and some difficulty in reading with the left eye; for instance, when reading figures, if there were six figures, as $1,250.40, he would call $250.40. He was still able to keep books and tell time by his watch until May, 1916, when a diagnosis of optic atrophy was made by an oculist elsewhere, and the spinal fluid examined. He had not been able to read or tell time by his watch since then. At the time of his first examination at the clinic he could distinguish moving objects with his right eye; vision in the left eye was 6/15—2. The field showed a well marked bitemporal hemianopsia. Both nerve heads were pale, the right having less color than the left, with some shrinkage of the nerve of the right eye. A roentgenogram of the head showed the sella to be normal. A general physical and neurologic examination detected no changes due to disorders of the pituitary secretion, nor evidences of brain tumor. Because of the appearance of the nerve heads and the visual fields, the patient was operated on, Oct. 10, 1917 (Adson). "A large greenish-red tumor was found underneath the optic commissure and compressing the right optic nerve. It was composed of some glandular tissue and a considerable amount of fibrinous tissue, and was fairly well encapsulated and markedly adherent to the commissure and to the right optic nerve."

CASE 250408 (Continued).—A roentgenogram of the head showed the sella to be negative, but disclosed a large calcified pineal body. The nasal ac-

TABLE 5.—GROUP 3: CASES WITH ENLARGED SELLA AND THINNING OF THE BASE AND EROSION OF THE CLINOID PROCESSES SHOWN IN ROENTGENOGRAM.

| Case | — Vision — Right Eye | Left Eye | Visual Fields | Pathologic Diagnosis |
|---|---|---|---|---|
| 219123 | 6/6 | L. p. | Bitemporal hemianopsia | Carcinoma or sarcoma |
| 201329 | L. P. | C. f. | Temporal hemianopsia (right eye); contraction (left eye) | No operation |
| 204823 | 6/6 | 6/15 | Left homonymous hemianopsia | No operation |
| 205813 | C. f. | Nil | Temporal hemianopsia (right eye) | No operation |
| 45560 | Nil | 6/10+2 | Temporal hemianopsia with contraction (left eye) | Malignancy |
| 236675 | 6/30—1 | 6/20+2 | Bitemporal hemianopsia | Glioma |
| 271683 | M. o. | 6/30 | Bitemporal hemianopsia | Carcinoma |
| 25558 | 6/12 | 6/60 | Bitemporal hemianopsia | No operation |
| 257278 | 6/15 | 6/60 | Bitemporal hemianopsia | Carcinoma |
| 248126 | L. p. | 1/60 | Bitemporal hemianopsia | Carcinoma |
| 268798 | 6/6 | C. f. | Bitemporal hemianopsia | Sarcoma |
| 293423 | 3/60 | 6/15 | Bitemporal hemianopsia (atypical) | Glioma |
| 288874 | | | Bitemporal hemianopsia | Malignant cellular tumor |

TABLE 6.—GROUP 4: CASES WITH COMPLETE DESTRUCTION OF SELLA SHOWN IN ROENTGENOGRAM.

| Case | — Vision — Right Eye | Left Eye | Visual Fields | Pathologic Diagnosis |
|---|---|---|---|---|
| 216363 | Nil | 6/7 | Temporal hemianopsia (left eye) | Soft extradural tumor |
| 253633 | 6/30 | 6/60 | Bitemporal hemianopsia | Sarcoma |
| 262796 | 6/60+ | C. f. | Contraction (right eye), temporal hemianopsia (left eye) | Gliosarcoma |
| 245366 | L. p. | M. o.‡ | Small triangle fourth quadrant (right eye) | Glioma |
| 251151 | 3/60 | Nil | Temporal hemianopsia (right eye) | No operation |
| 274037 | 6/60 | Nil | Marked temporal contraction (right eye) | No operation |
| 35174 | 6/5 | M. o. | Bitemporal hemianopsia | No operation |

‡ Moving objects.

cessory sinuses had been exenterated, following which the visual acuity improved and the size of the visual fields increased temporarily. Because of the appearance of the nerve heads (absence of neuritis) and the visual fields, the patient was operated on, Feb. 22, 1919, for pituitary tumor (Adson). "On exploring the optic commissure, the tumor was found bulging in front and pressing out laterally on each optic nerve. The upper portion of the tumor was very cystic, so that a depression was made on either side by the optic nerve. The tumor was not adherent either to the optic nerves or commissure. About 2 drams of watery fluid escaped when the capsule of the tumor was opened."

CASE 254897.—Mr. D., aged 38, a contractor, came to the clinic, Jan. 3, 1919, with a diagnosis of pituitary tumor made elsewhere. The trouble had begun in the spring of 1918. At that time he was sick for several days, drank large quantities of water, and passed a large amount of urine. In April he had "catarrhal fever," for which he was in the hospital for more than a week. He apparently recovered from that condition, but his home physician sent him to a neurologist who "gave him tablets to absorb a tumor in the head, back of the eye." He had not had much headache until the last two months. Early in August, 1918, he first noticed that the temporal field of the left eye was becoming blind, followed by loss of visual acuity, judged by the fact that he could not see to read with that eye. By November 1 the vision of the right eye was very much reduced. During the last six months of 1918 he had noticed loss of libido; the sexual organs seemed to be getting smaller and he was always drowsy. At the time of examination at the clinic the patient could tell time by his watch, a radiolite, with the right eye. Vision in the right eye was 4/200, in the left, 2/200. The fields showed bitemporal hemianopsia with definite vertical division thru the macular region. Ophthalmoscopic examination showed the nerve heads to be round. No swelling, no atrophy, nor injection was present. The nerve heads were only very slightly pale, without shrinkage of the substance of the nerve itself.

A roentgenogram of the head showed the sella to be normal, a calcified pineal gland being present. Jan. 18, 1919, operation was done (Adson). "The commissure which was brought into view presented a brownish cystic mass situated underneath and between the optic peduncles. The mass was about 2.5 cm. in diameter and contained a golden gelatinous material. Two small solid bodies were removed which had apparently originated in the pituitary gland. These proved to be carcinoma on microscopic examination."

CASE 207683.—Mrs. S., aged 28, came to the clinic, Sept. 10, 1917, complaining of loss of vision in the left eye and of partial loss in the right eye. She had some constitutional evidence of dyspituitarism, such as gain in weight, in the past four years, and menstrual disturbances since June, 1917. She had been without eye trouble until June, 1916, when she noticed failing of vision in the left eye. By May, 1917, sight was entirely gone from the left eye and markedly diminished in the right eye. After some treatment by a local physician, the vision of the right eye returned to normal for a while, began again to diminish, and gradually became worse. The patient stated that five days previous to examination in the clinic vision in the right eye was 20/200. On first examination the vision in the right eye was 1/60, in the left, nil. The external appearance of the eyes was normal; the pupils were equal, and normal in size, shape, and position. The pupil of the right eye reacted to direct light stimulation and in accommodation; there was no consensual reflex. The left pupil reacted to consensual light and accommodation, but not to direct light. Examination of the right eye showed the media to be clear, the nerve head round, of a waxy pallor, and without loss of substance. The disc margins were well defined. The fundus was otherwise normal. The nerve head of the left eye was round, pale thruout, but without loss of substance; the disc margins

were well defined. No other fundus lesion was present.

A roentgenogram of the head showed the sella to be normal. The patient was operated on, Oct. 1, 1917 (Adson): "A dark red, nodular, extremely vascular, completely encapsulated tumor, about 1.85 cm. in diameter, was found situated anterior to but beneath the optic commissure, elevating the optic nerve and commissure. The right optic nerve was large and edematous (one and one-half times as large as the normal nerve). This tumor was entirely separate from the brain substance, but appeared to be adherent to the right anterior portion of the sella turcica." Microscopic diagnosis of the tissue removed was sarcoma.

CASE 270734.—Mrs. R., aged 48, examined at the clinic, May 12, 1919, complained of loss of vision in the left eye and greatly diminished vision in the right eye. In July, 1916, the patient had had severe headaches with nausea and vomiting for one day. She received medical treatment for goiter for two weeks, after which she noticed that the vision of her left eye was becoming dim. It seemed to diminish from the temporal side. The following March she had her eyes tested for glasses, and was told that vision in the right eye could not be improved.

At the time of examination at the clinic, her vision in the right eye was 6/15, in the left, nil. The right field showed, with the 5 mm. test object at 290 mm., preservation of a small portion of the upper inner quadrant and about one half of the lower inner quadrant. With a 20 mm. test object, there was contraction to between from 40 to 50 degrees of both upper quadrants and the lower outer quadrant, with a large absolute scotoma in the temporal half of the field. The ophthalmoscopic examination showed marked uniform pallor of the nerve heads without loss of substance. There were no other fundus changes. The central nervous system examination was negative except for eye findings. The general physical examination gave no evidence of disturbances which could be attributed to changes in pituitary secretion. June 21, 1919, the patient was operated on for pituitary tumor (Adson). "An encapsulated tumor of reddish granular appearance was found bulging between the two optic peduncles which, when dissected out, left the optic peduncles perfectly free." Microscopic diagnosis of the tissue removed was epithelioma.

CASE 295780.—Mrs. H., aged 49, came to the clinic, Nov. 7, 1919. The diagnosis of tumor of the hypophysis was made elsewhere from the appearance of the visual fields and general constitutional disturbances due to disorders of secretion. It was questionable whether the right eye retained light perception; vision in the left eye was 6/60. The field of the left eye showed a complete temporal hemianopsia with the dividing line exactly at 90 degrees thru the point of fixation. Ophthalmoscopic examination showed small normal pink nerve heads, with clearly defined margins. There was no pallor, no suggestion of atrophy, nor evidence of a previous neuritis, but a moderate retinal arteriosclerosis was present.

The roentgenogram of the head showed the sella to be unchanged. Dr. Wilder reports: "This certainly is an endocrinal disturbance, probably pituitary, with a question as to the presence of early acromegaly." The metabolic rate was —23. There was strong evidence of cerebral arteriosclerosis, emaciation, and general debility. Pituitary operation was deferred.

The greater number of the cases in this series fall into Groups 2 and 3. It is difficult to diagnose enlargement of the sella because of the variation in the size of normal sellas, and in cases in which no erosion has taken place it is often necessary to rely on one's judgment of the appearance of the sella in relation to other bony parts of the skull as to whether enlargement exists. With thinning of the base of the sella, however, and particularly if the clinoid processes are shortened or eroded, there is very little difficulty in noting the change. Judgment of the condition of the sella should be passed only after examination of stereoscopic plates, altho frequently the condition is apparent from a single plate. A comparison

of the group convinces that the amount of bony change wrought on the sella by the tumor gives little indication of the type of tumor to be dealt with, altho well marked changes, such as in Group 4, forewarn that pathologic changes are extensive and the prognosis is quite grave.

SUMMARY.

The final diagnosis of pituitary tumor seldom rests entirely with the ophthalmologist. However, his responsibility is clear. There should be the closest relationship between the ophthalmologist, the neurologist, and the surgeon in reviewing the results of examination of cases of suspected pituitary tumor. Pallor of the discs and changes in the visual fields should always incite suspicion of pressure processes, the etiology of which should be ascribed less hastily to tabes and other neuritic processes. The ocular examination should be carefully carried out before roentgenograms or general physical and neurologic examinations are made, but no case should be diagnosed on the eye findings alone.

Ocular phenomena from pituitary tumor, however, often develop early in the course of the disease, and should be recognized by the oculist. The decision on operation should properly rest on the changes in the field and the appearance of the optic discs, since the indications for operation disappear with the development of optic atrophy that makes restoration of visual function impossible.

## UNIFORMITY IN THE ESSENTIALS OF PERIMETRY

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This paper urges the importance of standardizing perimetric methods with reference to the illumination and the definiteness of the colors used, and the expression of the size of the test object in an angular rather than a linear unit. Read before the College of Physicians of Philadelphia, Feb. 19, 1920 (see p. 524).

The value of a scientific principle or instrument is usually apparent in the modifications which either principle or instrument may undergo as each one comprehends its value. The numerous stereoscopes, which have been offered to the profession during the last three quarters of a century, pay tribute to the value and necessity of this instrument in the practice of ophthalmology. The same may be said of the perimeter and, paradoxically as it may seem, the multiplicity of instruments and methods offered to the profession furnishes the strongest possible evidence of what the profession as a whole thinks of the value of perimetry as a diagnostic aid even tho it is not uniformly practiced.

It is not essential that we all adopt the same methods of study if the conclusions arrived at by devious paths are uniform. Our language, however, should be the same and the conclusions reached should be expressed in definite and known terms in order that facts deduced from our studies may have broad scientific values. This has not been the order of the day in perimetry largely because of a lack of uniformity in the very essentials of its practice. The drawing of conclusions correctly depends primarily on the premise. If that is correctly stated there is apt to be a uniformity in the conclusions at which we arrive. If the premise is vague or incorrect, conclusions are also apt to be faulty.

In the practice of perimetric methods in America, in Europe or in any part of the scientific world, there are three things about which we should definitely agree. They are: first, the character of the illumination or the light conditions under which studies are made; second, definiteness in the colors used, expressed in scientific language; and, third, accuracy in the size of the test objects employed, expressed in degrees rather than in linear measure.

In the AMERICAN JOURNAL OF OPHTHALMOLOGY, March 1918, the author briefly discussed the first of these propositions. There are probably not two offices equally illuminated either by natural daylight or by artificial illumination. Of "sunlight," Parsons says (*An introduction to the Study of Color Vision*, page 4) "it varies much—the variations being not only in intensity but also in composition, owing to the unequal absorption of different rays by the atmosphere, and this absorption again varies greatly according to the amount and nature of the matter suspended in the air." There is no uniformity in sunlight either in any particular locality at different times of the day, or at the same time on successive days, and there is much less uniformity in different communities.

Added to this uncertainty is the great variability of the quantity of sunlight admitted to rooms and the great changes which it undergoes by the contents of the room. It is a logical conclusion, therefore, that in our effort to obtain a light which at least may be made approximately uniform we must turn to artificial illumination to solve the problem. Filters, which have been scientifically prepared to approximate sunlight under certain standard conditions, naturally are the logical source to which we turn for help. In doing this we not only encounter considerable variability but become entangled unfortunately in commercial difficulties. In the brief paper referred to above, by unwittingly recommending a certain screen which seemed to be perhaps the best that we had at our disposal, the author aroused the ire of competing firms, which led to unpleasant correspondence. The fact remains, however, that some definitely approved filter should be uniformly adopted as our standard and this should be determined and standardized by spectrum analysis.

The adoption of such a filter will not solve all our problems. It will not be possible to obtain uniformity in intensity both because a definite measure will be impracticable and because of the deterioration of the source of illumination. The adoption, however, of a specific filter and a fairly definite source of illumination will at least bring about an approximate state of uniformity which can not now be approached by our varied and individual methods of illumination. Any standard which may be adopted will vary to some extent. For practical purposes, however, a definite filter of known efficiency, definite candle power to the square foot of surface to be illuminated and arranged at a definite distance from the tangent screen, will insure sufficient uniformity from which to draw conclusions.

The second and third propositions admit of more definite and satisfactory solution. In the matter of colors, there has been no concerted attempt made, to the author's knowledge, to state in exact language the colors which should be used. Wilbrand in Norris and Oliver, recommends the Heidelberg flower papers. There is, however, no reference in definite terms as to what particular tone, expressed in wave lengths, should be used. Red, for example, begins at the junction with orange 656$\mu\mu$ and ends in extreme red at 760$\mu\mu$. The test objects for red sold on the market are possibly not found in these extreme ends of the red but certainly have too wide a latitude of variation to bring about uniform results. The same is true of green and blue.

Altho color pigments will vary considerably, just as transmitted colors, the colors selected for perimetric work should be expressed in definite wave lengths, and these definite hues should be uniformly employed in the making up of perimetric instruments. In selecting our standards one must bear in mind that practicality is a prerequisite. If we had in mind purely laboratories' methods, the task would be easier and possibly pure spectral colors could be employed. In practice, however, pigments must be used, and purity in color can not be ideally obtained. It would seem possible, however, to express the tone of the pigments in language sufficiently definite to insure at least approximately uniform colors. In order that the proper

tone be maintained, the pigmented papers which are employed could be subjected to tests by the spectroscope, and an efficient standard might thereby be maintained.

It has been suggested that the red and green adopted in the semaphore and signal lights on our railroads could be used for this purpose. Our needs, however, are entirely different. In signal lights both red and green are selected with a view to the counterbalancing of an excess of the blue in the blue-green, for example, by the yellow in the kerosene lamps used. The same is true of red. The average red employed approximates 700$\mu\mu$. This is too dark. It should be more in the direction of the orange about 670$\mu\mu$. Green is a better tone and is mostly found around 522$\mu\mu$. I believe this likewise is too far to the yellow side. 468$\mu\mu$ would be an average blue. These are only suggestions. Definite wave lengths should be recommended by a commission and adopted by our ophthalmologic bodies in an effort to obtain uniformity. If left to individual selection our colors will remain unstandardized and the present unsatisfactory state of affairs will continue to exist.

As the intensity of the light gives brightness to the object up to a certain point, it changes the hue or tone as well as purity of a color beyond a given point. For this reason transmitted illumination does not tend to uniformity, and it is the writer's belief that transmitted illumination on perimeters should not be employed. It adds to the variability which we are endeavoring to reduce to a minimum. Further objection to test objects thus illuminated lies in the size of the carriage containing the object. It is totally lacking in the delicacy and precision made possible in the test object carriers furnished, for example, with Lloyd's stereo-campimeter—indestructible knife edge objects, minute, accurate and unobtrusive. A third valid objection can be raised against transmitted illumination. With the exception of red glass properly treated, transmitted illumination is open to the same objection as that of pigments, namely, impurity of the color. It is perhaps a little easier to obtain purer tones by means of transmitted light than pigments for laboratory purposes, but the same objection obtains; and for practical purposes the problem would be even more complicated than that of pigments, with added objections from which the pigments are exempt.

The size of the test objects employed varies even more than the color tones. This is due largely to the method of study. Bjerrum, for example, used a 1 mm. test object at a two meter distance and a 5 or 1 mm. test object is recommended by others for use on a perimeter of a 333 mm. radius. Between the instruments of shortest radius the Schweigger hand perimeter and Peter's hand campimeter, both of which have a radius of 165 mm.; and the Bjerrum screen of 2,000 mm. radius, there are a considerable number of perimeters and tangent screens of varying radii. To designate the diameter of the test object in millimeters, therefore, used on any particular instrument gives one but a very indefinite value when compared with an instrument of a longer or shorter radius. Expressing the size of the test object in the square surface exposed to the eye, as employed by a few, adds nothing in uniformity to the measure of the diameter.

As all measurements of fields are made on an arc of a circle or a tangent of the same, the language is always in degrees or fractions of degrees. There is no good reason, therefore, but habit, why the test object should not also be expressed in the same language, i.e., in degrees, minutes or seconds subtended by the test object on any particular arc. The value of this change in our nomenclature must at once become apparent. Test objects would be properly adapted to the radius of the arc for which they are intended. A 30′ test object suitable for use on Schweigger's hand perimeter or Peter's hand campimeter would be equivalent to our present 1.5 mm. object. On Lloyd's stereo-slate the test object would meas-

ure 1.8 mm.; on the average perimeter of 333 mm. radius the test object would measure 2.9 mm. and at 1,000 mm. or one meter the object would be 8.7 mm. in diameter. These values need not be remembered as each instrument and its equipment would be constructed on a scientific basis, and test objects of 30′, 1°, 2° and 3° would be furnished with each type of perimeter or tangent screen.

It may seem to some that the linear measure might appropriately be retained for tangent work inasmuch as the length of the tangent included between the radius and secant may be expressed in linear measure. The tangent, however, is forced upon us by its greater flexibility and for the sake of uniformity our terminology should be the same whether the arc or tangent perimeter is employed, as the angle subtended is regarded as the same in either case.

It requires no stretch of the imagination to calculate the enhanced value which this system must necessarily give to perimetric literature, and the simplicity and uniformity which would be added to our own individual methods. It would furnish us with a uniform language which all would understand.

The makers of the Lloyd stereo-campimeter and the Peter hand campimeter are making these necessary changes in the interests of more scientific methods than are now employed, and it is hoped that other makers of perimeters and campimeters will adopt this uniform method.

If we can secure concerted action on the question of illumination, on the standardizing of colors and on the adoption of this uniform method of designating the size of the test object, perimetry will offer even more as a diagnostic aid than we have conceded to it in the past.

## OCULAR NOTES ON LETHARGIC ENCEPHALITIS, WITH TWO CASE REPORTS

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This account of the disease with the report of two cases points out the difficulty in discriminating between lethargic encephalitis and syphilis as the cause of the ocular symptoms.

The symptom complex known as lethargic encephalitis is at this time being broadly and methodically studied by the neurologist and no doubt he will bring much to light regarding this comparatively new disease, if indeed it is new. At the same time it should be very minutely observed by the ophthalmologist, for in a large percentage of cases the latter is the first to see the patient, and the symptoms that are first noticed are apt to be confined entirely to the eyes.

It would be interesting to know how many mild cases of this condition have been diagnosed syphilis of the central nervous system and treated as such, and their recovery put down as another victory for mercury and the arsenol compounds. It is quite possible also that some cases of syphilis have been diagnosed as the other condition and the patient suffered thereby; but the burden of proof lies in the direction of the encephalitis being mistaken for lues rather than the reverse.

Early in the disease differentiation is difficult, as the predominating symptom of both conditions is partial or complete paralysis of the external ocular muscles. Most commonly those supplied by the third cranial nerve are affected. But this is not constant, nor has it any diagnostic value, as the pathology of both diseases is a toxic process attacking the motor nuclei of the nerves, and as their grouping covers but a relatively small area, it may just as well attack one as the other or all of them, and this last is

indeed the case, as a rule. A very important difference seems to be the matter of the permanence of the paralysis. In the luetic type the lesion is generally of long standing before it yields to treatment, or at least before any appreciable change is noted, while in the lethargic type the paralysis is fleeting; and may shift from one muscle to another in the period of a week, or even less, as in the case reported below.

The second case reported is interesting in that the only ocular symptom noted is the persistent paralysis of the left iris to light stimulation. This typical Argyll Robertson pupil has withstood all attempts to prove that it is due to syphilis, in spite of the overwhelming weight that literature gives to the evidence.

Repeated blood and spinal Wassermanns have been returned negative. Provocative doses of mercury and arsenol preparations have failed to return a positive Wassermann. Competent neurologic examination has failed to bring out further evidence of syphilis. The most searching cross examination has given no history that could possibly be construed syphilitic.

CASE 1. Mr. —— was referred to the writer by his physician, Jan. 16, 1920. He complained that the day before he suddenly noticed that he saw double. Had never before had any ocular complaint, nor had he ever worn correction for refractive error, and was in good health at the time. No history of venereal disease, married and has one healthy child. Only illness remembered was a few years previous when he had an infected arm, and was forced to have it incised. Complete recovery.

Examination: Healthy appearing man, aged 26, weight 180 lbs. No physical disability, other than double vision complained of. Pupils reacted well to light and accommodation. Scopolamin 1/5% sol. was instilled and after forty-five minutes, examination revealed the following: Inspection negative. Limitation of movement of right eye externally. Cover test showed marked esophoria. Fundus normal in each eye.

Refracted R.+0.37⌒+0.50 ax 90.
L.+1.00⌒+0.25 ax 90.

With Maddox rod and rotary prisms an esophoria of 25 prism degrees, and a left hypophoria of 3 prism degrees, were noted. Patient continued to see double.

Atropin was prescribed and patient confined to bed on light diet pending report from spinal and blood Wassermann reactions.

Jan. 19 esophoria of 12 degrees, L. H. of 2 degrees. Jan. 22, esophoria of 8 degrees, L. H. of 1 degree. Jan 24, esophoria of 3 degrees, no L. H.

Patient no longer saw double and was apparently recovered. He now insisted on returning to work and his correction was prescribed.

On Jan. 26 patient again returned complaining of double vision. Examination now revealed esophoria 16 degrees. Jan. 28, esophoria of 28 prism degrees, L. H. of 2 degrees. Jan 31, esophoria of 25 prism degrees, L. H. of 2 degrees. Feb. 2, esophoria of 22 prism degrees, L. H. of 2 degrees. Feb. 4, esophoria of 20 prism degrees, L. H. of 2 degrees. Feb. 6, esophoria of 16 prism degrees, L. H. of 1 degree. Feb. 8, esophoria of 8 prism degrees, L. H. of 0 degrees. Feb. 9, esophoria of 2 prism degrees, L. H. of 0 degrees.

The patient now had comfort and freedom from his diplopia until Feb. 22, when he again returned complaining of double vision and its attendant asthenopia. At this time examination showed an exophoria of 12 prism degrees and a left hypophoria of 4 prism degrees. During this last period the eyes were not kept at rest by means of a cycloplegic, but a ground glass was worn over left eye.

Wassermann reactions were returned negative. Other ophthalmologists were called in consultation and verified the above findings. Not being satisfied in my own mind as to the cause of this peculiar fleeting symptom complex, I referred the patient to the Neurological Institute in New York City, and a week later received a most complete report from Dr. J. W. Stephenson with the diagnosis of lethargic encephalitis. After treatment as advised by the neurologist, the patient gradually improved, until the muscle

balance was again normal and to date it has remained so.

During the first week while the patient was under instillations of atropin, he mentioned once or twice that he was drowsy, and he seemed at times mildly "out of his head" as he talked at times of vague and irrelevant matters while conversing with members of his family. This peculiarity was attributed to an idiosyncrasy toward atropin and the medication was changed, upon which the symptoms disappeared. This was no doubt the most important symptom representing the actual condition, yet it has probably been many times attributed to medication, when in reality it was the basis of a correct diagnosis.

CASE 2. Miss ——, age 33 years. No history of previous illness, other than ordinary diseases of childhood. Venereal disease denied. Has led a rather sedentary life, very little outdoor exercise.

Two weeks previous to the consultation patient noticed while before the mirror, that the pupil of the left eye seemed larger than that of the right. No apparent visual defect noticed subjectively. Examination revealed typical Argyll-Robertson pupil in left eye. Light reaction totally abolished. Reaction to accommodation retained. Vision uncorrected was normal. Under cycloplegia vision is normal with the addition of plus half diopter spheres. External muscle balance is normal. Fundus reveals no abnormality. Perimetric examination was normal for red, white, and green. Both pupils reacted readily to scopalomin as a cycloplegic, and loss of accommodation obtained for a period of six days. At the end of this time eserin reduced both pupils to pin point, in about half an hour.

Both blood and spinal complement fixation tests were negative. Second provocative tests were also returned negative. Careful physical examination by an internist revealed nothing worthy of note. Report returned from the neurologist is strongly in favor of a diagnosis of a mild case of lethargic encephalitis. Based on the pupillary dyscrasia, a history of slowing up of general reaction time, tendency toward drowsiness during the day, even after a full night's sleep, and absolute absence of anything that could be attributed to syphilis.

After a period of treatment extending over seven weeks, including courses of strychnin nitrat, and pituitary extract (Armour), the improvement is most satisfactory, the pupil now reacting to light and showing the enlargement only in the presence of a very brilliant sunlight or a strong artificial illumination.

## THE ORIGIN OF THE VITREOUS

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The current conflicting views with regard to the development of the vitreous are here discussed by the light afforded through histologic study of an anomalous case. Presented before the Section on Anatomy and Anthropology of the China Medical Missionary Association at its Biennial Conference in Peking, China, February 21-28, 1920.

In 1917 the writer reported a case from the pathologic laboratory of the Massachusetts Charitable Eye and Ear Infirmary, showing a large number of interesting congenital anomalies in an eye which had been removed from an infant five weeks old because of suspected glioma. The histologic examination revealed that the white glistening body which had been seen without as well as with the aid of an ophthalmoscope, proved to be not a glioma but a dense fibro-vascular sheath on the posterior surface of the lens. (Fig. 1.)

The unique morphology of the vitreous of this case seems worthy of further study and report, inasmuch as it appears to throw light upon a much disputed embryologic question, i.e. the origin of the vitreous; hence this paper.

The eyeball was sectioned as a whole in the horizontal antero-posterior position. The stained sections show that the vitreous body had retracted on account of the formalin fixation, leaving about the posterior one-fourth of the chamber free except for a small amount of coagulated serum and albuminous precipitate. It had also retracted to-

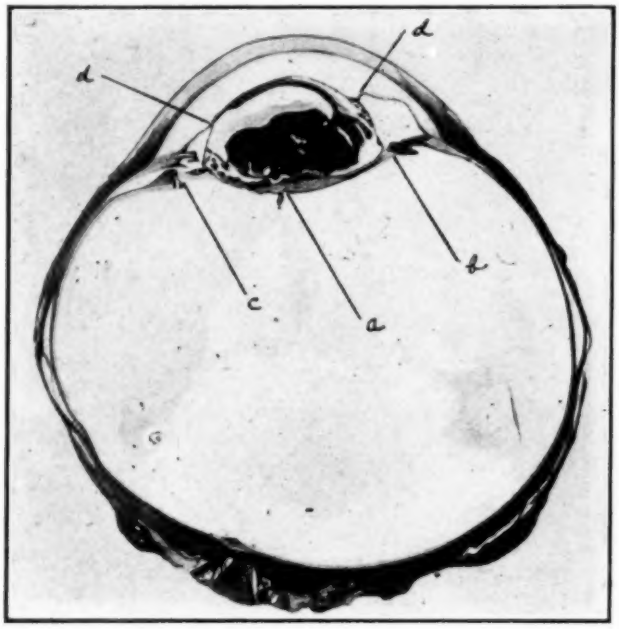


Fig. 1.—a. Fibrovascular sheath of the lens showing stub of hyaloid artery. b. Adhesion of sheath to ciliary body. c. Adhesion of sheath to transitional retina. d. Posterior synechia. (x 4.5).

wards the periphery, thereby creating a V-shaped vitreous-free space, in the center of the chamber. This space also contains coagulum.

Examination of the lens shows a cortical cataract. Posteriorly it is covered with a persistent tunica vasculosa lentis, which, on account of a marked proliferation of its connective tissue cells, has become a thick fibro-vascular sheath (Fig. 2). Near its posterior pole the lens capsule has ruptured. Thru the ruptured area connective tissue cells from the sheath have proliferated to a depth of 0.48 mm. The maximum thickness of the sheath external to the capsule is 0.36 mm. In some places the sheath extends peripherally to the equator of the lens. In other places it has proliferated horizontally along the zonular fibers and has formed contact with the ciliary processes on the temporal side (Fig. 3) and with Lange's fold on the nasal side (Fig. 4). Sections stained with Verhoeff's[14] elastic-fiber tissue stain show distinctly many elastic fibers in this sheath. A few elastic fibers are even found mingled with the spindle cells that make contact with one of the ciliary processes. Thruout the sheath are found cross sections of vessels whose lumens are filled with blood. Near the posterior pole of the lens sheath is a persistent hyaloid artery whose lumen also contains blood cells (Figs. 2 and 3).

The vitreous fibers were brought out in a remarkable manner by a special method of staining suggested by Verhoeff of Boston, thru whose courtesy I have the opportunity of presenting this case. The sections selected were first bleached by Verhoeff and Fisher's method, then stained for four hours in Verhoeff's elastic tissue stain, differentiated in a one per cent solution of

ferric chlorid, and counterstained in eosin.

Three varieties of vitreous fibers, distinguished according to their position and morphology, were found to exist:

1. The first are the protoplasmic connecting processes found between folds of transitional retina adjacent to the ciliary body. It appears as tho the internal surfaces of these folds had at one time been in mutual contact, and subsequently separated as the eyeball grew, except for the basal processes of the cells which stretched out into long cones and finally into fine protoplasmic threads. These are best seen in horizontal peripheral sections where the embryonic retina is formed into many lateral plications (Fig. 5).

2. The second variety consists of very delicate fibers which appear to come from the ciliary epithelial cells found in the region of the junction of the orbicularis and the first ciliary process. These fibres sweeping backward in close proximity to the retina are inserted one by one into the internal limiting membrane of that structure. Their number from before backward gradually becomes less until finally they disappear entirely. This variety of fibers is best seen in sections showing certain areas on the temporal side, where there are no obstructions like the folds of Lange which are found on the nasal side, to prevent their uninterrupted course backward along the periphery of the vitreous chamber.

3. The third variety is composed of fibers which originate from the cells of the persistent tunica vasculosa lentis (Fig. 6). These fibers are in general much larger and coarser than the other two varieties. In the region of the posterior pole of the lens and the central axis of the globe, the fibers are the coarsest. Extending from the region of the posterior pole of the lens to the periphery of the fibro-vascular sheath, the fibers gradually become finer but more numerous. They also become finer and finer as they proceed backward in the chamber until finally, viewed with the high power of the microscope, they seem to lose their individual identity. Even then it is possible to see from the differential stain that the fibers as a mass have broken away from their insertion into the hyaloid membrane, and have retracted leaving spaces containing coagulum only. The growth of these fibers has taken place in such a way that the outer fibers, which are the finer, were

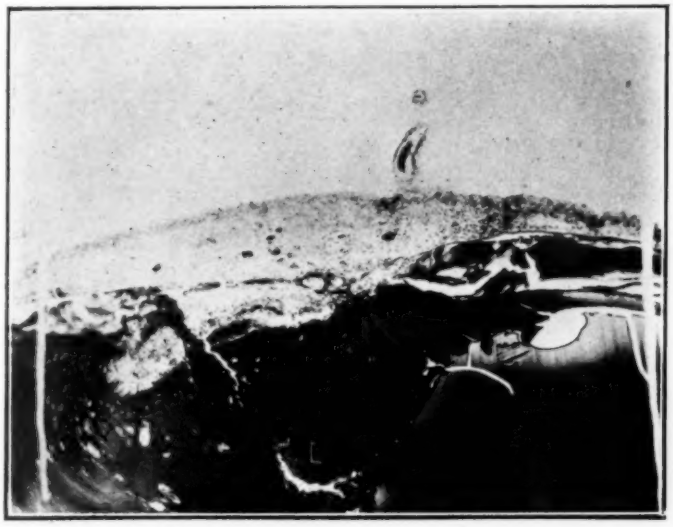

Fig. 2.—Patent hyaloid artery and thick fibrovascular sheath on posterior surface of cataractous lens. (x 50).

pressed gradually more and more towards the periphery, by the more rapidly gowing and consequently the coarser central fibers. The outermost of these fibers are either in contact with or lie parallel to those of the second variety in their concentric arrangement. Several of the outer fibers are nucleated at or near their origins in the fibro-vascular sheath (Fig. 4). There are also irregular cross anastomotic

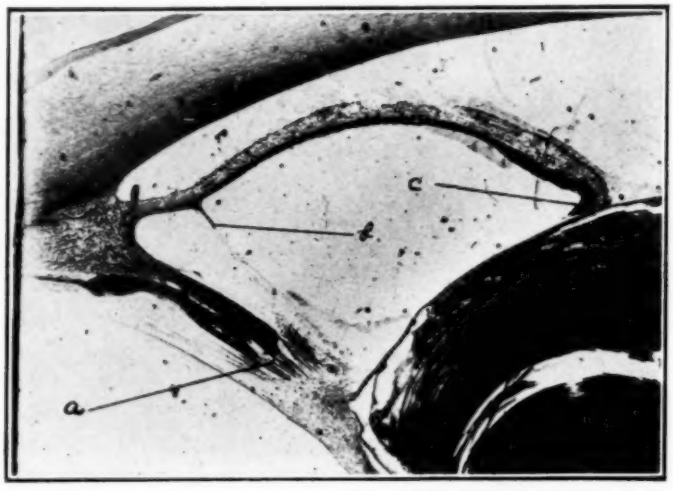


Fig. 3.—Temporal view of lens, iris and ciliary body.a. Fibrovascular sheath attached to ciliary processes. b. Iris processes attached to lens. c. Posterior synechia and entropium uveae. (x 30.)

fibers which appear to have had their origin in some structure which had *intra vitam* occupied the central axis of the vitreous chamber. The unfortunate disappearance of this structure, which undoubtedly was a mass of persistent hyaloid vessels, must be considered an artefact.

## THEORIES CONCERNING ORIGIN OF VITREOUS.

In 1848 Schoeler[11] advanced the theory of the mesodermal origin of the vitreous. He held that embryonic connective tissue gains entrance into the globe thru the fetal cleft, and the narrow space between the primitive lens and the margin of the secondary optic vesicle. His theory also includes the possibility of a layer of mesoderm between the primary optic vesicle and the superficial ectoderm contributing toward the formation of the vitreous.

In 1879 Herzog[4] stated he believed that the vitreous is developed from the cells of the retina. About twenty years later Carini[3] supported Schoeler's mesodermal theory, while Tornatola[13] and Rabl[10] supported Herzog's theory of ectodermal origin. Tornatola, denying the existence of an internal limiting membrane of the retina, stated that the innermost cells of the embryonic retina are the source of origin of the vitreous and that from these cells little fibers grow out which thru numerous anastomoses form the vitreous. Rabl held that the first appearance of the vitreous takes place in the neighborhood of the retina ciliaris prior to the appearance of mesoderm in the secondary optic vesicle.

Since the beginning of the twentieth century, a number of others have written ten on the development of the vitreous. Wolfrum,[16] von Szily,[12] and Addario[1] consider the vitreous to have a retinal origin. They believe that the fine protoplasmic connecting processes, found between the lens primordium and the inner layer of the optic cup in the very young embryo, represent the primitive vitreous; also that coincident with the

progressive histologic differentiation of the retina, the power of the latter to form vitreous progressively diminishes, from the region of the optic stalk towards the pars caeca retinae. The final vitreous source, they believe, is confined entirely to the pars ciliaris retinae.

Magitot[8] and Mawas[9] classify the vitreous chronologically into three divisions, viz.: (1) The primitive or primordial vitreous, which is a product of the marginal zone of the embryonal retina. This vitreous is short-lived and has apparently disappeared by the time the embryo attains the length of 12mm. (2) The transitory or neuroglia vitreous, which is marked by a proliferation of Müller's cells into the vitreous chamber and by the growth of a mantle or neuroglia which, according to these authors, appears at the end of the eighth week and envelops the entire hyaloid vascular system. When this system later disappears, the associated neuroglia vitreous also disappears. (3) The final or definitive vitreous, which develops as a fibrillary formation from the entire inner surface of the retina, especially the ciliary portion. Their opinion, therefore, briefly is that the vitreous is directly and entirely of retinal origin and that both vitreous and retina are to be considered a part of the central nervous system.

Other writers postulate the mixed development, i.e., the partly ectodermal and the partly mesodermal structure of the vitreous. Lenhossék[7] advances the theory that the entire vitreous body, except the hyaloid canal, is derived from the primordial lens by the formation of basal cones from which sprout fine little fibers. He considers the hyaloid canal to be the only mesodermal part of the vitreous and that the cells composing it enter with the hyaloid vessels. Kölliker[6] also advocates the theory of the double development, but believes that the ectodermal part is derived, not from the lens, but from the retina.

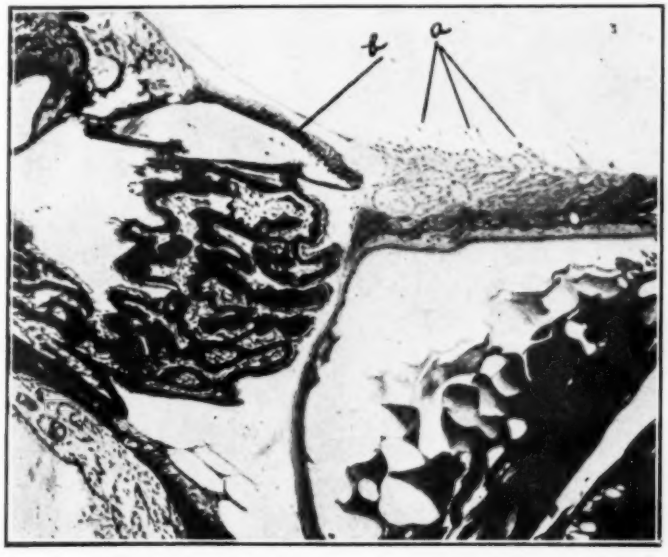


Fig. 4.—Nasal view of lens and adjoining structure. a. Nucleated vitreous fibres coming from fibrovascular sheath of the lens. b. Rudimentary retina attached to fibrovascular sheath (x 130).

Bach,[2] in a joint work with Seefelder, states that "the construction of the vitreous body has entered into a new phase on account of the determination of a connection between ectodermal fibers and mesodermal cells. It has been proved particularly that the epithelial fibers of the vitreous combine

directly with the vessel endothelial cells so that a continuous strand of protoplasm is found between Müller's cells in the retina and the endothelial protoplasm." He further says that the question is not so much as to what extent the vitreous is formed by the lens or retina or by both, as it is to what extent the mesodermal tissue participates in the structure. Bach, therefore, accepts without question an ectodermal origin, but only intimates the possibility of a mesodermal origin as well.

The theories reviewed above include:

I. A mesodermal origin from
  1. Embryonic connective tissue entering the globe thru the fetal cleft.
  2. Embryonic connective tissue entering the globe over the lip of the secondary optic vesicle.
  3. Cells entering with and proliferating from the hyaloid vascular system.

II. An ectodermal origin from
  1. The retina
    a. The innermost cells of the whole embryonic retina.
    b. The innermost cells of the pars ciliaris retinae only.
    c. Proliferation of Müller's cells or neuroglia tissue.
  2. The basal cells or cones of the primordial lens.

DISCUSSION OF HISTOLOGIC FINDINGS OF THIS CASE.

It has been stated above that three varieties of vitreous fibers, distinguished according to their position and morphology, were found. In what way do they conform to the types as advanced in the theories reviewed above?


Fig. 5.—a. Primitive vitreous fibres. b. Rudimentary retina. c. Lange's fold of the retina. (x 150.)

1. The first variety consists of the protoplasmic connecting fibrillae found between folds of transitional retina in the region of the ora serrata. These indicate what probably did take place thruout the course of the whole retina in its early embryologic state, before a differentiation of the cells into special layers has occured and before the retinal cells are finally closed off from the vitreous chamber by a cuticulum, the internal limiting membrane of the retina. In very early embryos exactly the same form of protoplasmic fibrillae are seen coming from the basal cells of the primordial lens, before there is any evidence of a cuticulum which later becomes the lens capsule.

Inasmuch as the differentiation of retinal cells and the retinal cuticular formation begins posteriorly and gradually extends forward towards the ora serrata as the eyeball grows, it would

be natural to expect any remnant of early vitreous to be found where transitional retina still existed. Inasmuch as this early vitreous is seen only in connection with undifferentiated or embryonic retinal or lenticular cells, it must be concluded that it has only a comparatively brief existence. The object of its existence seems concretely stated in a term given by von Szily, viz., embryonal supporting tissue. This term implies constructive aid to the proper formation and growth of the eyeball.

It could also imply its use as a support or framework for the hyaloid vascular system which begins during the seventh week of fetal life. This system however quickly outgrows its supports which having fulfilled their chief function disappear. The first variety of vitreous fibers therefore is that mass of typical protoplasmic connecting processes from the nuclear-free or marginal zone of the inner layer of the secondary optic vesicle, and as such conforms to the theory of an ectodermal origin from the innermost cells of the whole embryonic retina. Their existence then is only transitory.

2. The second variety consists of fibers originating from the pars ciliaris retinae. Normally these fibers radiate thruout the whole chamber, but in this case the third variety so dominates the space that their course is restricted to a very narrow area at the periphery, where they lie close against or parallel to the internal limiting membrane of the retina. They cannot be considered as a proliferation of Müller's cells because the embryonic condition of that area of the inner layer of the optic cup does not warrant such a differentiation. In fact the term "neuroglia vitreous" as used by Magitot and Mawas certainly is to be questioned, because the formation of a cuticulum which is called the internal limiting membrane of the retina has begun before we can definitely differentiate Müller's cells. The second variety therefore does not warrant any other ectodermal origin than from the cells of the pars ciliaris retinae.

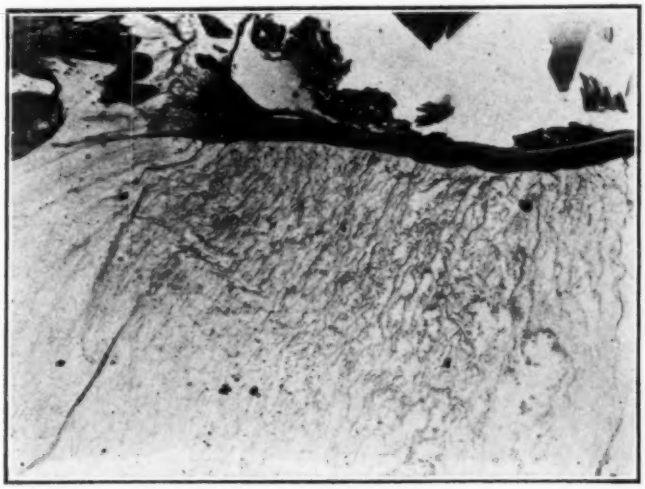

Fig. 6.—Large vitreous fibres coming from the fibrovascular sheath of the lens. (x 30.)

3. The third variety of fiber, which is the predominating type, comprises that mass of fibers which certainly appears to come from no other source than from the cells of the fibro-vascular sheath of the lens. This sheath is definitely to be considered as a connective tissue structure because of its positive staining reaction by Van Gieson's method. Also because of the presence thruout the sheath of numerous elastic tissue fibers. That this variety of vitreous fibers is not merely a cuticular

product is shown by the fact that a number of fibers themselves are nucleated and morphologically are greatly elongated spindle cells. The normal eye presents nothing comparable in its embryologic history to the coarseness of these fibers. Their existence indicates very clearly a participation on the part of the normal hyaloid vascular system in the formation of a vitreous structure.

It differs from the normal eye in that the growth of the definitive vitreous fibers from the pars ciliaris retinae has largely been inhibited; because of the markedly normal increase, both in size and probably in number, of the connective tissue or mesodermal vitreous fiers which, *pari passu* with the persistence of the hyaloid vascular system and the proliferation of its connective tissue element, continued their nonarrested development. That these fibers originate entirely from a structure which is known in normal cases completely to disappear between the eighth and ninth month of fetal life is evidence that their existence also must be transitory. The third variety of vitreous fibers therefore represent a mesodermal origin from the hyaloid vascular system.

This case, therefore, supports the theory of the mixed origin of the vitreous. It presents two forms of ectodermal vitreous, both from retinal cells. It most vividly demonstrates a connective tissue or mesodermal vitreous, about which there has been so much dispute for several decades.

Based upon the findings of this case and the histology of the normal embryo, I suggest the following chronologic and genetic classification of the vitreous of the human eye:

1. A transitory ectodermal vitreous, originating from the innermost cells of the primitive retina, and from the basal cones of the primordial lens.

2. A transitory mesodermal vitreous originating from the connective tissue cells that enter with, or proliferate from the hyaloid vascular system.

3. A definitive or permanent ectodermal vitreous, originating from the cells of the pars ciliaris retinae.

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# ARE THE OBJECTIVE FINDINGS IN REFRACTION WORK THE MOST ACCEPTABLE TO THE PATIENT?

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This paper reviews the factors which limit adherence to the prescription of correcting lenses indicated by objective tests.

None of us will deny that the objective test is the best method we have at our disposal for the correction of refractive errors, yet it does not agree with the subjective test in a large majority of cases. It does, however, diagnose the existing error and is an excellent guide for further examination.

It is a matter of personal preference just what instruments we use in doing retinoscopic work—whether we use a large or a small mirror, a gas or electric light. In the Infirmary I was taught to use the gas light, which gave a soft and diffuse light; but in later years I have used a special electric bulb with frosted globe under a hood fitted with diaphragms. This light gives a more distinct reflection and possibly one is better able to detect minute errors. To me the small mirror is more satisfactory than the large one, for the diameter of the reflection is not so large. Only a small portion of the reflection enters the pupil while the total reflection at one meter distance is about twice the diameter of the mirror.

The acuteness of observation of the movements of the retinal reflection and the neutralization of the same are all important, for if one is not extremely careful the rapid movement in slight errors may be overlooked, or even mistaken for a reversal. With such cases I have learned to make a very slow movement of the mirror and have gotten results. A high error can be more easily detected because of the slow movement of the reflection until we reach a point of neutralization to within 0.25 D., then extreme care must be exercised. With high plus errors it has been my practice to place weak lenses in the frame at first, and creep up, rather than to place a strong lens at first which is more or less confusing.

In all cases of astigmatism the movement is greater in one meridian than the opposite; and when the difference is slight, or the axis irregular I place a weak minus lens in the trial frame to emphasize the movement and to approximate the axis. This practice has been satisfactory to me in numerous instances and I have not failed to determine, within a few degrees, the axis accepted by the subjective test.

I think we should not be dictated to as to just what cycloplegic we should use. Every ophthalmologist has his preference. In the last thirty years I have used them all, but prefer, as a rule, homatropin and cocain combined, tho with young children and very doubtful cases I prefer atropin. The former, however, is satisfactory if sufficient time is allowed for it to act.

For the past few years it has been my habit to determine the retinoscopic findings, first without, then with a cycloplegic. I then had a working basis to depend upon, and at the postcycloplegic subjective examination, I found the more comfortable and acceptable lens, or combination of lenses, were those more in keeping with the noncycloplegic objective findings. For this reason I have been using a cycloplegic only in excepted cases beyond a certain age.

In known cases of weak plus error under a cycloplegic, especially when reflex symptoms persist, I have found it better practice to apply the lenses required as soon as possible, without the use of a miotic; and allow the

muscle to gradually relax under the influence of the lenses. I seldom use a miotic following cycloplegia except above certain ages; and in all suspected cases I never use a cycloplegic or even a mydriatic. With thousands of cases, I have never gotten an evil result, besides, the strained ciliary muscle has more time to rest. Without a cycloplegic or mydriatic, light thrown upon the retina at first produces a reflex contraction of the sphincter pupillae, and this effect is also produced by accommodation. But by persisting in the examination and allowing plenty of time, the pupil is seen to gradually dilate; probably due to a partial exhaustion of the reflex function. Under these conditions fairly true correction can be attained objectively, with cases in which cycloplegia is contraindicated.

In all hyperopes there is a corresponding degree of development of the ciliary muscle; and in all true myopes there is a corresponding degree of atrophy of the same muscle. In the first instance are we apt to underestimate the error and in the second instance we are liable to overestimate the error, without a working knowledge of the total error previous to a final examination.

In very many cases we cannot deduct one diopter from the total error in hyperopia, nor add one diopter to the total error in myopia—as is the rule; however careful the examination, and exact the distance of one meter from the patient may be; for the patient will not always accept these exact deductions or additions, and modifications are often required.

On the other hand I have had patients accept the exact total error determined with the retinoscope, even when the vision previous to cycloplegia was normal in each eye. For example, a woman 39 years old had vision, right and left, 6/6. Under cycloplegia, the vision was 6/10. The retinoscopic examination showed in the right eye horizontally, no movement; vertically, + 1.00 D.; in the left eye, horizontally, + 0.25 D.; vertically, + 0.75 D. She accepted, right eye, + 1.00 D. cyl. ax. 90°; left eye, + 0.25 D. S. ⊃ + 0.50 D. cyl. ax. 90°. She wore these lenses with comfort until presbyopia approached.

Had I followed the rule she would have required right eye, —1.00 D. c. ax. 180°; left eye, —0.25 D. sp. —0.50 D. c. ax. 180°. It is needless to say that had I followed the rule the result would have been disastrous. Thirty-nine years is rather an unusual age at which I control the ciliary, but as this patient had neurotic symptoms combined with headache, and as astigmatism was evident and the vision normal with each eye, I concluded to use homatropin. The antecycloplegic and the cycloplegic findings were the same.

I have had other cases much younger, whose manifest and total error were the same. Several patients in this class had less than 6/10 vision in each eye, yet they were able to read fine print at ten inches.

It is not my purpose to discourage the application of the rule for the correction of errors of refraction, for very many cases of hyperopia will accept no other lenses than those that conform to the retinoscopic findings, less one diopter. The following is an example: A man 54 years of age with vision in each eye but 3/60. The reflection movements were neutralized in each eye: vertically, +4.50 D.; horizontally, +5.00 D. He accepted +3.50 ⊃+0.50 cyl. ax. 180° in each eye which produced vision of 6/6. It has been my experience that the higher the error, the more often is this the case.

The lower errors are the most trying and patients less often accept the objective requirements; however, the astigmatic correction is accepted in full. Frequently when the movement is neutralized below one diopter, a plus lens is accepted.

It is these lower errors which cause so much reflex disturbance of the nervous system, headache, etc. They usually have normal vision, or even much better, without a lens; and the ciliary

muscle is constantly active. Some of our internists tell us we must "fit the nervous system" even at the expense of falling short of normal visual acuity. We all recognize the fact that the eye is a part of the nervous system and that the visual impression is recorded in the brain as it is received on the retina. Why then should we make a patient uncomfortable from the lack of normal vision, and thereby cause a greater call upon his reserve forces by effort to overcome the influence of a lens, when such effort can be avoided? We must not forget that many reflex nervous symptoms are due to other causes than uncorrected refractive errors—causes that may have been overlooked by the internist.

It has always been my purpose to correct the patient's vision to 6/6 or the normal point, if possible; and not infrequently the patient will have, under correction, 6/5 or even 6/4. I myself, at 62 years of age, have 6/5+ with a high, corrected mixed astigmatism. A weak plus added cuts my vision to below the normal point.

As a rule, our patients are intelligent people and know when the letters are clear and distinct. It is most aggravating, when on the application of a plus or minus lens, a patient says he does not know whether he sees better or not. Such persons have little or no decision with regard to the affairs of life in general. I have learned to know them after a few minutes' conversation. There is always an element of doubt in their minds, as to results, even before the examination has begun. They are often chronic neurotics. They have consulted all sorts of specialists in all departments of medicine, but have failed the Christian Scientist.

When the practice of medicine becomes a fixed science, such as chemistry and mathematics, then we can follow fixed rules, but not till then. The ciliary muscle and the accommodation reflex, together with a stable and well balanced mental and nervous system, are factors to be considered in good refraction work; just as much as functional and pathologic factors. With such otherwise normal persons we have to allow for some action of the accommodation, according to the degree of its development. If a man is sick, however (aside from the need of glasses), his ailment should first be diagnosed and treated; for unless he is well he is in no condition to meet the physical requirements for vision.

Those of us who have had experience in general medicine would easily recognize a sick man. I have had two cases of socalled walking typhoid, who came to me for glasses for relief from headache; and I have referred back to physicians numerous cases of Bright's disease, tabes dorsalis, syphilis, and other diseases which required their services rather than mine.

Accommodation is influenced by menstruation, indigestion, constipation, etc., also by localized diseases of the throat, teeth, nose and sinuses. I not infrequently tell a patient to see his physician, and wait until he is well; then to come in for an examination of the eyes. Many of them whom I did not see for several months told me that after they got well, their vision gave them no further trouble.

Of course refractive errors do cause many reflex functional troubles, but they do not cause local or general disease nor toxic absorption. The best advice one of our internists has given us as ophthalmologists is, "not to think too much in terms of glasses," but rather to study the individual case as a whole. I think all intelligent ophthalmologists are doing this, and I believe that the dogmatic assertions of the extremist are fast dying out and becoming a thing of the past. Our minds should be as broad as our subject, for even the best of specialists in any department of medicine is liable to err.

The best vision obtained under certain conditions is unmistakable, but under toxic influences on the macular

fibers it is unsatisfactory, for it is often not two days alike. The etiology of such a case is often more trying than the refraction.

I am apparently drifting away from my subject, but the conditions mentioned are recognized factors, influencing the subjective refraction from that of the objective.

There are two chief factors concerned in good refraction work: The physician who knows well his subject, and an intelligent patient who knows when his vision is at its best.

# NOTES, CASES AND INSTRUMENTS

## SELF INFLICTED CONJUNCTIVITIS.

MARCEL DANIS, M. D.

BRUSSELS, BELGIUM.

Translated from the French by Dr. M. W. Fredrick, San Francisco.

Among the new ocular diseases, which the army oculists have had brought to their attention during the late war, self inflicted conjunctivitis deserves mention. Altho simultation and automutilation are not very frequent amongst the Belgian troops, and especially amongst those at the front, I have had occasion to see a number of cases of self inflicted conjunctivitis. Much more frequently seen among the troops at the rear, this form of conjunctivitis presents special clinical symptoms which form a definite picture, and make it easy of detection.

### CLINICAL FORMS.

The disease presents itself under two forms: an acute and a chronic form. These symptoms are common to both forms:

Self inflicted conjunctivitis is always monolateral, the right eye being the one usually affected, and the disease is confined to the lower cul-de-sac. The cause alleged by the patient is always traumatism, such as caving in of a trench, sand thrown in the eye, lacrimatory gas, or burn with Yperite (mustard gas).

THE ACUTE FORMS. Edema of the lower lid, sometimes edema of the upper lid also. Marked hyperemia and edema of the inferior palpebral conjunctiva, of the lower fornix, and of the inferior segment of the bulbar conjunctiva. Sometimes small conjunctival hemorrhages are seen, similar to those seen in the acute conjunctivitis caused by Weeks' bacillus. The superior palpebral conjunctiva, the conjunctiva of the upper fornix, and the upper bulbar conjunctiva, are rarely involved, and stand out in contrast to the lower parts by the absence of lesions. The cornea is rarely affected, altho chemosis is frequent. Tearing and photophobia are always present, combined with exaggerated blepharospasm. There is neither secretion from the conjunctival sac nor agglutination of the lids. This form of provoked conjunctivitis is seen mostly at the front.

THE CHRONIC FORM: Tearing is profuse, and there is almost always conjunctival secretion, with absence of microbial elements. The lower palpebral conjunctiva is thickened, and has a characteristic color, that of washed meat, or salmon-pink, and shows at times a papillary hypertrophy suggesting the granulations of trachoma. The ciliary margins are erythematous and often eczematous. This form is found only among the troops at the rear. The chronic form may show exacerbations with the symptoms of the acute form, due to the introduction of a fresh dose of the provoking agent into the conjunctival sac. During my stay in a hospital at the rear it was a regular occurrence to see exacerbations of this conjunctivitis on the days set for going into action.

The agent used for provoking the conjunctivitis is chiefly powdered *ipecac* which is found in abundance in all the dressing stations, where it is used to counteract the effects of the asphyxiating gases. It was the French, and especially the Colonial soldiers who taught our soldiers this easy and safe way of being evacuated. Tobacco, dental tartar, pepper, mortar, soap, benzo-naphtol, gasoline, and urine, are less frequently used. Among the French troops castor oil beans was a favorite, but I have never had occasion to see the lesions produced by this agent.

The soldier with self inflicted conjunctivitis generally has the provoking agent on his person, either in his coin pocket, in the secret pocket of his wallet, or in the case of his watch. As soon as this is discovered his trouble ceases with characteristic rapidity.

TREATMENT: *Sublata causa tollitur effectus.* The acute cases get well in a few days under an occlusive bandage fastened with collodion; the improvement in the first twenty-four hours is marked. In the chronic cases the cure takes longer; to the hermetically sealed occlusive bandage daily applications of yellow oxid of mercury ointment are added. A recurrence during treatment is always due to a leak in the occlusive bandage.

## UNUSUAL BENIGN EPITHELIAL TUMOR OF LID

SANFORD R. GIFFORD, M.D.

OMAHA, NEBRASKA.

The following case, of no special clinical interest, is reported merely for the interest of those curious in things pathologic.

W., a man of 21, appeared on account of a lump on his upper lid which had existed for several years and had been increasing in size slowly. There was no history of trauma, nor of any similar growths. The patient showed a tumor 8 mm. in diameter beneath the skin of the right upper lid. No other anomalies of the eye were noted, nor any other tumors on the body. It was considered probably a fibroma, and as the patient was bothered by its appearance, it was removed under local anesthesia by Dr. R. C. Person, who was then assisting Dr. Harold Gifford. A small piece of skin over it was excised and the little tumor enucleated. In a week the patient was discharged. The wound healed by first intention. The patient was not seen again.

*Pathologic Report.*—The tumor was fairly hard, and no areas of softening or caseation were seen on gross section. Microscopic examination (see fig. 1) showed the growth to be made up of 8 to 10 lobules of very faintly staining material, separated by fibrous trabeculae. No connection with the overlying epidermis was made out in the sections, and a fibrous capsule surrounded it completely. The fibrous trabeculae and capsule stained like normal connective tissue, and showed very few vessels. The lobules stained very faintly blue with hematoxylin and eosin, yellow to orange with picrofuchsin. In them the faint outlines of epithelial cells could be made out, though the nuclei did not stain. In several lobules structures were observed almost identical with the "Epithelial pearls" seen in epitheliomata.

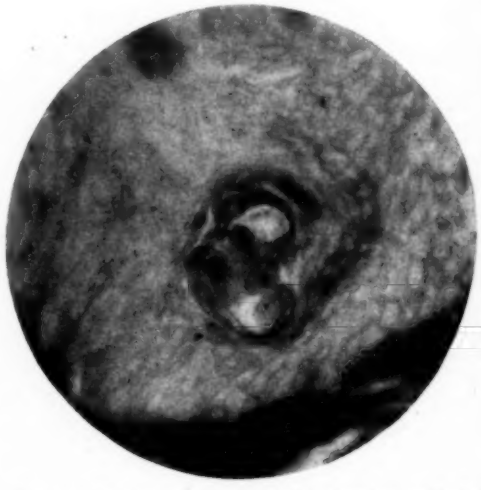

Fig. 1.—Section of tumor of lid showing epithelial mass in center of lobule surrounded by connective tissue. (Gifford.)

(See fig. 1). A few places stained deeper blue with hematoxylin, showing a deposit of lime salts. Dr. Eggers, pathologist of the University of Nebraska Medical College, kindly examined the sections and agreed as to the epithelial character of the original growth. He called it a benign epithelial tumor which had undergone hyalin change.

As to its origin, the cells stained too faintly for it to be determined whether they were from the Meibomian glands or from the surface epithelium. There was no lumen in the lobules, which would have suggested a degenerated dermoid cyst. It seemed most probably a down-growth from the basal cell layer of the epithelium which had been enclosed early in dense connective tissue and cut off from blood supply so that its cells had undergone the peculiar hyalin change observed. Pos-

sibly some epithelial growths are prevented from becoming malignant by some such process. Tho benign tumors of the lid, fibromata and dermoids, are not uncommon, I have not encountered descriptions of similar hyalin degeneration of an epithelial growth among them.

## A MODIFIED EYE SPECULUM, SUPPORTED FROM THE BONY FRAMEWORK ABOUT THE ORBIT

JAMES H. MCKELLAR

LOS ANGELES, CALIF.

Unquestionably, the chief element of uncertainty as to the result of an operation for cataract extraction, supposing that the operation is done by a surgeon of skill and experience, depends under ordinary conditions upon the behavior of the patient during the operation; and this is a factor in the case that is largely outside of the control of the operator. All qualified to pass on the question will agree, that the one act which the misbehaving patient may do, that more than any other will jeopardize the success of the operative procedure, is the sudden spasmodic contraction of the orbicularis palpebrarum muscle. This increases the intraocular pressure, and, if the section has been made in the eyeball, results in the escape of vitreous with its frequently dire results.

As is well known, when the ordinary type of spring speculum is used, more pressure is exerted upon the eye, if squeezing occurs, than when the speculum is not in place. Even when the patient is not squeezing, the mere presence between and under the lids of the regular spring speculum increases the intraocular tension, as may be easily determined by experiment.

The problem, then, in regard to the management of the lids during an operation in which the globe must be incised is: how to keep the lids separated and, at the same time, prevent the lids from exerting pressure upon the eyeball. The use of the standard spring speculum fulfills the first requirement, but obviously ignores the second proposition of the problem. It seems to me that, in the event of serious loss of vitreous during an operation due to spasmodic contraction of the lids, when the lids might have been supported but

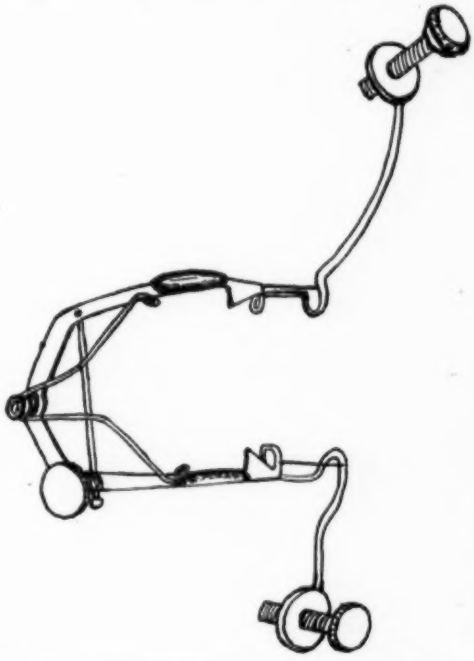

Fig. 1.—Modified eye speculum to secure support on the bony framework of the orbit. (McKellar.)

were not, the surgeon cannot hold himself entirely blameless.

Perhaps the first method that suggests itself as fulfilling both indications of the problem is the separation of the lids by the fingers of an assistant. This plan, while generally effective, is open to the objection that the hands of the assistant are very much in the way of the operator, that considerable skill and practice are necessary in the assistant, and that a sudden squeeze on the part of the patient may result in the fingers slipping.

Various retractors have been devised, one for the upper and one for the lower lid, each to be held in the hand of an assistant. Of this type are the Fisher lid hooks.

These instruments are undoubtedly

of much value in the hands of a skilled assistant, but a considerable degree of skill is required. Also, the extra assistant is unavoidably somewhat in the way, and transferring the retractors from the hands of the assistant to those of the operator, if this be done, must be somewhat awkward, except possibly in the case of men who are long used to working together.

The Green[2] instrument has the advantage that it is supported by the hand of an assistant, and is practically away from the field of operation. It is a valuable instrument, but it is subject to the other disadvantages enumeratcd in regard to the retractors.

Ewing[3] in 1915 reviewed comprehensively the history of eye specula and illustrated over one hundred types.

In considering this problem, the possibility of using the bony framework of the face as support for the speculum occurred to me. I was not able to find a speculum of this kind described in the literature. Writing to the principal surgical instrument house of this country, inquiring for such an instrument, the only one submitted to me was the Brownfield speculum. This instrument has a base that is designed apparently to rest upon the margin of the orbit, the speculum itself being supported from near the outer angle of the base. This instrument did not prove useful in my hands, as I could not prevent the upper point of support from slipping under the margin of the orbit. I consider the principle of the construction of this instrument good, but it has mechanical disadvantages.

I have devised a modification of the standard spring speculum that I have found exceedingly useful in operations in which it is necessary to open the eyeball. Before using it in operative work I made repeated experiments with it, regarding intraocular tension, using the Schiötz tonometer: (1) without speculum in place, (2) with speculum in place, and adjusted, (3) with speculum in place and adjusted, and patient contracting the orbicularis. The intraocular tension was not raised in the least either by the presence of the speculum between the lids or by the patient's squeezing.

The instrument is very simple in construction and principle. Using a spring speculum of the type in general use (Weeks), I had a leg of German silver wire soldered to the nasal end of each blade. The lower leg is one inch long and almost at right angles to the blade, flaring slightly forward and outward. The upper leg is about one and one-half inches long; passing up and inward from the upper blade and flaring more decidedly forward. At the extremity of each leg is an adjustable screw. A pair of these instruments are necessary, one for the right and one for the left eye. The speculum with screws short is inserted in the regular way. The lids are opened to the desired extent and the blades are fixed, as in the use of the unmodified speculum. Then the screws at the ends of the legs are adjusted so that the speculum is slightly raised and no longer rests upon the eyeball. The upper screw now rests upon the skin covering the frontal bone above the superciliary ridge near the median line. The lower screw rests upon the superior maxilla below the infraorbital foramen. The speculum is now supported entirely from the bony framework, the points of support being the two adjustable screws and the outer end of the instrument, which rests upon the outer margin of the orbit. A small gauze pad between the outer end of the speculum and the outer rim of the orbit sometimes is an aid in adjustment. When the instrument is to be removed it is supported by one hand, while the screws are shortened by the other. The speculum is then taken from between the lids in the usual way.

I submit the description of this instrument, hoping that it will receive consideration and prove as useful to other operators as it is proving to me.

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1. Fisher. Trans. Ophth. Sec. A. M. A., 1918.
2. Green. Ophth. Rec. Feb. 1915.
3. Ewing. Amer. Jour. Ophth., Feb. 1916.

## PULSATING EXOPHTHALMOS

HENRY M. THOMPSON, M.D., AND
JOHN W. THOMPSON, M.D.
PUEBLO, COLORADO

We showed this case before the Pueblo Clinical and Pathological Society on April 14th. Notwithstanding that there are over three hundred cases on record, we deem the condition of sufficient rarity to merit mention. This formerly rare lesion may be seen more frequently with the great increase in the use of the automobile, and the many accidents which occur daily thruout the country.

Mrs. T. H. S., age 32, came to our office April 12, 1920. On September 12, 1919, she was in a motor accident. The right side of her head was struck; also she sustained minor injuries to the right hand and left foot. She was unconscious for a short time only, after the accident. There was absence of any bleeding from the nose, throat or ears. Recovery seemed to be complete, with the exception of annoying, loud roaring in the right ear.

On December 25th she first noticed that her right eye was more prominent than the left, but this condition was apparently intermittent. On April 8th, four days before presenting herself, roaring in the right ear practically ceased, and she experienced a sharp pain around the right eye, the exophthalmos becoming more marked. Since that time there has been a complete absence of pain. Diplopia was experienced at times.

*Examination* revealed a marked protrusion of the right globe. The vessels of the upper lid and conjunctiva were greatly enlarged and tortuous, and the chemosed lower conjunctiva protruded between the lids. The cornea was clear, the anterior chamber of normal depth, pupil oval, somewhat dilated, reacted to light. Tension was normal. Ocular movements were limited, with complete absence of abduction. No diplopia was made out.

The fundus was seen thru clear media. The disc was oval, edematous, reddened and the margins but faintly discernible. The arteries were small, the veins very full and tortuous. We were unable to detect any impulse on palpation apparently because of tremor of the lids. A loud systolic bruit was heard when a stethoscope was placed over the right upper lid, disappearing on compression of the right common carotid. Nervous symptoms were negative.

Vision= R., 20/70; L., 20/30.

The case is of unusual interest because of the time which elapsed between the accident and the appearance of the proptosis. Inasmuch as the patient has refused any radical operative procedure, we are treating her with rest and intermittent compression of the common carotid. It is interesting to note that in fracture of the base, the prognosis is more unfavorable than in pulsating exophthalmos resulting from other causes.

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## RETINITIS DISCIFORMIS (MACULAR HOLE)

BY AARON BRAV, M.D.
PHILADELPHIA, PA.

The purpose of this paper is an appeal to ophthalmic clinicians to adopt a uniform term for a condition in the macular region that has been described in different ways by different men. A case such as I report below is not seen often. I have seen only one case in my 20 years of hospital and private experience. I have seen similar lesions described in literature as "macular hole," "macular degenerations," etc. I feel that these conditions are due to some inflammatory process of obscure origin in the retina and should be described by the term that will indicate the pathology thereof.

The term "retinitis disciformis" at once tells us that there is an inflammatory process in the retina, causing a disc-like area of retinal destruction. The term "hole in the retina" is unscientific. It was employed probably to indicate its traumatic origin. We know now that trauma is not its direct cause. The condition is usually unilateral, but may occasionally be bilat-

eral (as in the case reported by Chance, Symmetrical Macular Degeneration, A. J. O., v. 3, p. 241).

So far as I know, the term retinitis disciformis has not been used in describing retinal diseases, and the term is not found in the American Encyclopedia of Ophthalmology. We are all familiar with the term keratitis disciforms, describing a definite inflammatory process of the cornea, and I believe that the term retinitis disciformis is the proper term for the clinical condition described below.

H. N., boy, age 9, consulted me Jan. 10 on account of low visual acuity in the right eye. The boy was sent home from school on account of defective vision. Examination reveals nothing abnormal externally, except some insufficiency of the right internal rectus muscle. Under mydriatic we find clear media, disc oval, somewhat hyperemic, edges well defined. In the macular region we find a disclike area having the appearance of a red cherry. This area is sharply circumscribed, its edges well defined, but not pigmented. The surface of this area is red and somewhat granular. In the center of it is a minute whitish streak. The surface of this area is below the level of the retina and surrounding it in a circular formation are several small yellowish spots forming a ring, reminding one of a retinitis circinata. The veins in the temporal region of the retina are full and somewhat tortuous, while the nasal side is practically normal.

Vision in this eye is reduced to 5/60 not improved by glasses. Error of refraction as measured by the retinoscope is +2.00 Sph. ⊂ +2.00 cyl. axis 60°. The boy has a good family history. Wassermann test negative. Urine negative. Mother is very nearsighted, father is farsighted, two other children wear glasses. (I did not see them.) One little sister, age 4, has a very high degree of myopia, measuring 15 diopters. I have never seen such high myopia in a child so young. There seems to be some family tendency to ocular changes. The boy's left eye is normal. There is no history of traumatism. There is no doubt that we are dealing here with an obscure inflammatory process of the retina involving chiefly the macular region. The term retinitis disciformis has occurred to me as the most rational, and I think it is applicable to similar conditions involving the macular area. I report this case, hoping similar cases may be reported under this new name.

# SOCIETY PROCEEDINGS

**Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.**

## OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

London, April 29-30, and May 1, 1920

MR. JOHN B. STORY, P.R.S.C.I., President.

### Training in Ophthalmology.

THE PRESIDENT, in his introductory address, said that two questions had aroused much interest in the ophthalmologic world during the past twelve months. The first was the establishment of a higher diploma, to distinguish the ophthalmologic specialist from the practitioner who had no special knowledge, and had had no expert training in the subject. The second was the teaching and examination of medical students in ophthalmology before admission to the Medical Register. On both these matters valuable reports had been published by the Council of British Ophthalmologists. It was this second heading which occupied his attention in this address.

A certain knowledge, both theoretic and practical, of ophthalmology ought to be possessed by every person admitted to the Register. There were

two reasons for this: the vast majority of practitioners were certain to have to diagnose and treat diseases and injuries of the eyes, in certain circumstances when the aid of the specialist could not be promptly obtained, if at all. The second reason was, that in many serious constitutional disorders the evidence afforded by ocular conditions was most important, and often they were the symptoms which induced the sufferer to seek medical advice. Interstitial keratitis was often the first evidence of infantile syphilis, even before the classical teeth of Jonathan Hutchinson had erupted. Ocular tuberculosis might be the first manifestation of that disease, and acquired syphilis might make its appearance in the iris or choroid or retina, long after the patient had quite forgotten having had the original disease. Ocular signs were important in tabes, disseminated sclerosis, meningitis of all varieties, brain tumors, nephritis, diabetes and arteriosclerosis among the common maladies. Every qualified person should have some knowledge of glaucoma, and of the effects of atropin in aged eyes.

Last year, the Council of British Ophthalmologists brought the question of ophthalmologic teaching before the General Medical Council, recommending that compulsory attendance at an ophthalmic hospital should be required of all students, and that there should be an examination by ophthalmic surgeons. The reply to that was a recommendation for ophthalmic hospital attendance, but a special examination was thought to be unnecessary. The action of the General Medical Council was regarded with astonishment in Ireland, where, for thirty years, every medical student had given three months' compulsory attendance at an ophthalmic hospital; and had to undergo an examination by two or more ophthalmic surgeons; and the results had been most beneficial to the young doctors, and perhaps still more so to their patients. The object was not to turn out half-educated specialists, but to prevent men being let loose on the public who saw no difference between a leucoma corneae and a cataract, and who mistook obvious iritis for equally obvious conjunctivitis.

It was held by many that the curriculum would be overloaded if ophthalmology was given this position in medical education. The reply, which was unanswerable, was that no such overloading had been caused in Ireland. There should be no specialty of which the registered practitioner should be quite ignorant. An examination, to be of use, must be a practical and clinical test: a paper examination he considered to be quite useless. Mr. Story related some of his examinership experiences and, in conclusion, said he feared that the pressure of the Society would have but little effect on the Mandarins of the General Medical Council. But he had great hopes that the weight of the great mass of the profession, who were not specialists, would succeed in getting these necessary reforms carried out.

**Enlarged Corneae in Goldfish.**

Mr. C. H. Usher read a paper on this subject which was called forth by the record of a case of enlarged corneae by Mr. Treacher Collins. In the fish examined the corneae seemed to be of uniform thickness. Enlargement of eyeball had been found in a number of different kinds of fish; these died if left alone, but the condition could be cured by careful attention to the water and food. The gas-bubble disease of fish kept in aquaria was attributed to diminution of pressure. The goldfish examined lived in three small ponds connected by short pipes to allow both water and fish to pass from one to the others. The source of the water was a spring which had been condemned years before for drinking purposes, as it was held to be contaminated with sewage. Hofer repeatedly saw opacity and perforation of the cornea in trout which lived in water containing iron. Burge produced corneal opacities and cataract in eyes of goldfish by ultra-violet rays when the fish were living in certain solutions, but failed to get the same results when they were living in tap water which contained very

small quantities of those salts. Gaylord found that artificially reared trout confined in tanks one above the other on a single water supply showed an increasing proportion of thyroid hyperplasias from the highest to the lowest tanks in the series. Adding to the tanks pure water, iodin, mercuric chlorid or arsenic retarded or prevented the hyperplasia. Marine and Lenhart found that three chief conditions influenced the thyroid growth in fish: a limited water supply, overcrowding, and overfeeding with a highly artificial and incomplete food.

**Megalocornea and Microcornea.**

Mr. Treacher Collins read this paper. In a case he described in 1913 as one of buphthalmos, with full vision and without cupping of the disc, it was evident that the enlargement of the cornea could not be attributed to stretching due to increased intraocular tension. This was shown by the absence of any of the signs of glaucoma, such as contraction of the field of vision and cupping of the optic disc, also by the absence of any ruptures in Descemet's membrane, or any want of definition at the sclero-corneal margin. He described a fresh case which he had recently seen in a woman who was the subject of a peculiar form of dwarfism. He attributed the condition of the cornea to some disturbance in the growth-regulating mechanism. He also showed that there was a condition of undergrowth of cornea met with in otherwise well-formed eyes.

**Nonoperative Treatment of Glaucoma.**

Mr. John Rowan read a paper, his title being "Are not some cases of glaucoma better treated without operation; and, if so, what are the indications?" The great object, he said, was to determine the cause of the increased tension. If the general factors producing it were known, something in the way of prevention might be done. Several cases had been kept under eserin for periods of months, one for two years, keeping back further developments, and in some cases resulting in improvement. If for any reasons, general or otherwise, an operation seemed inadvisable, keeping the patient under eserin and strict observation seemed best. But in the presence of signs of advancing disease, operation should be done. In the majority of cases he advised operation, especially early operation.

Discussion.—Sir Anderson Critchett described glaucoma as the bugbear of the ophthalmic surgeon. Admittedly operation should be done early, but in some instances, whatever the type of operation, or however skilfully done, there was a disappointing declension of vision. Some had ceased to operate for chronic glaucoma, and he would be very glad to learn what were the indications for operating, and for abstaining from operation, respectively.

Mr. Harrison Butler's practice was to operate in chronic glaucoma when the tonometer showed the eye tension was raised and there were signs of functional failure.

Dr. G. Mackay spoke of the tendency to the formation of pigmentary adhesions betwen iris and lens capsule, with diminished transparency following the prolonged use of eserin or other miotic.

Dr. Rayner Batten regarded the cupping of the disc as the disease, and the glaucoma as the symptom: the cupping was progressive, whether or not the tension was relieved.

Mr. Richardson Cross said that if central vision was good, and there was great narrowing of the fields, especially towards the fixation point, and there was an absence of inflammatory symptoms, one could safely rely on miotics. No dogmatic statements could be made which were applicable to all cases.

Mr. Treacher Collins agreed that many cases of chronic glaucoma could be kept in check by the continuous use of eserin, but if the symptoms mentioned by Mr. Cross increased, he advised operation. But such factors as the age of the patient and his expectation of life, and his blood pressure must be taken into consideration. If the blood pressure were high, that was an additional danger in operating.

Mr. R. R. Cruise thought the number of cases in which the pressure had been overcome by drops must be small in comparison with those in which the results were deplorable. He spoke highly of the value of the tonometer in these cases, not only in estimating the intraocular tension, but for judging of the progress in a given case.

Dr. A. Hugh Thompson said that as the ocular tension might vary from time to time, even at different hours of the same day, alteration in the visual fields was a surer sign of the condition of a case of glaucoma than the tension.

Mr. A. Greene (Norwich) thought it was to the physician one must look for an explanation of the cause of glaucoma: he should be asked to supply a drug which would control the secretion of the ocular glands, especially the ciliary.

Mr. B. Cridland thought most ophthalmic surgeons were not in favor of simple iridectomy for chronic glaucoma, especially in cases in which the field of vision was contracted and involved the fixation point. When "operation" was spoken of, he thought it should be understood to mean decompression. In several cases he had obtained satisfactory fistulization without touching the iris.

The president said that in cases in which the tension was distinctly high and the fields were contracted, and there was a central scotoma, he advised operation. During recent years the operation he had almost exclusively done was the trephine operation.

**Infection after Cataract Operation.**

Mr. T. Harrison Butler read a paper on infection after cataract operations, in which he discussed some reasons for failure. There were two types of inflammation, having a different etiology. The first was the acute wound infection, the septic hyalitis, panophthalmitis, most probable due to infection from without, mostly by the pneumococcus, often derived from a diseased sac or an ethmoiditis. In his second group the cause was mostly an endogenous infection, or due to general toxemia. Diabetes he regarded as a fruitful cause of failure.

**Diabetes in Relation to Ocular Disease.**

After an afternoon spent at the Royal London Ophthalmic Hospital inspecting and discussing clinical cases, the evening was devoted to a debate on the above subject.

Sir Archibald Garrod addressed himself chiefly to the subject of diabetic retinitis. In the diabetic form the ocular hemorrhages were apt to be guttate rather than flame-shaped, the white spots more opaque and sharply circumscribed, more scattered and less apt to group themselves around the macula. But albuminuria in diabetes did not necessarily point to serious renal damage; the amount of albumin in renal cases gave no sure clue to the gravity of the kidney lesion. Albuminuric retinitis was met with in young patients, even in children. This suggested that the occurrence of retinitis in diabetes was not to be attributed to the accumulation of sugar in the blood, nor of the accompanying aceton bodies. A contributory cause must be looked for other than the disorder of carbohydrate and protein metabolism, and if it were true that the retinitis was associated with cardio-vascular changes, this suggested an explanation. Most of the diabetic patients in his wards who had developed retinitis had evidences of renal disease also. He suggested that both diabetic and albuminuric retinitis were associated with high blood pressure and arterial changes. A line should be drawn between acute diabetic cases in early life, and the mild diabetes of middle life which might persist for many years without grave detriment to health. Cataract seemed to be the commonest eye trouble to which diabetics were specially liable. He urged the importance of diabetic patients being put thru a course of hunger treatment before an attempt was made to operate on the eyes.

Mr. Foster Moore discussed the subject in much detail, based upon careful observation of 6 cases. He said the chief ocular complications in diabetes were retinitis, cataract, retrobulbar

neuritis, retinal and vitreous hemorrhages, lipemia retinalis. Lesser conditions met with included alterations in intraocular tension, in refraction, also iritis and debility of accommodation. These he considered in detail. Retinitis had affected his older patients only: there was only one as young as 39; these usually had arteriosclerosis also, and sugar and albumin in the urine was common too. Diabetics tended to develop hemorrhages into retina or vitreous. The prognosis of retinitis in diabetics was much less grave than in renal retinitis: 60 per cent of Nettleship's cases lived beyond two years. The term "diabetic cataract" should be restricted to the cases of somewhat rapid opacity of lens seen in young diabetic subjects: it was always bilateral and of a diffuse homogeneous type. A certain number of diabetics developed defective vision, in some the cause being retrobulbar neuritis. Concerning alterations of refraction, a certain number of observers had noted a variation with the amount of sugar excreted: in most cases a decrease in the sugar output lessened the degree of the myopia.

Discussion.—Dr. Cammidge spoke of observations on 350 cases of diabetes. He thought the age-incidence of cataract and retinitis which had been observed was only explicable by the chemical changes taking place in the body at the various ages. Glycosuria was not a disease: he had seen a number of young people who had persistent glycosuria which, however, was but little affected by changes in diet, and the health did not seem to suffer. Two main groups of diabetics could now be well established: the pancreatic, and the hepatic. In the latter there was an increased formation of aminoacids, of which tyrosin was one, and there was an increased fat content in the blood, progressive as the patient became worse.

Dr. C. O. Hawthorne spoke of the association of ocular palsies with glycosuria, and of the fundus changes which might occur when sugar was present in the urine. Admittedly ocular palsy was a rare event in diabetes mellitus, therefore the glucose present in the latter could not cause the palsy. It was probably, he thought, a peripheral neuritis affecting the terminations of one or other of the ocular nerves.

Mr. R. R. James said all cases of cataract in diabetic patients in the hospital were first treated by the physician to lessen the sugar output, before any operation was attempted on the eye If it could be avoided, he preferred not to do iridectomy.

Mr. Burdon-Cooper spoke of finding tyrosin and cholesterin in lenses which had been removed from diabetic subjects. He had not yet tested such lenses for glycogen. He believed that the acids and ferments secreted by the ciliary body in the aqueous were responsible for the hydrolytic change in the lens.

**Prevention and Treatment of Ophthalmia Neonatorum.**

Members paid a visit to a special hospital for the treatment of this condition, under the Metropolitan Asylum Board (St. Margaret's), and afterwards discussed the subject in the large room. The debate was opened by Dr. Gibbon Fitzgibbon (of the Rotunda Hospital, Dublin). Among 38,106 born in that institution in 23 years the incidence rate of the disease was 0.24 per cent. Practically during the whole of that time the Crédé prophylactic treatment was used. As soon as the child's head was born, the eyes were wiped clean of all mucus with swabs of boracic lotion, and after the child had been bathed, one or two drops of a 1% solution of silver nitrat were dropped into each eye. Often, he believed, the child was infected in passing through an unclean cavity. He expressed a strong faith in silver nitrat. He had found an efficient vaccine a strong help; the maximum dose for an infant was 3 to 5 millions.

Mr. M. S. Mayou (surgeon to the institution) entered into the subject thoro. He had found the meibomian secretion contained the Xerosis bacillus on the third day of life, and it was almost constantly present soon after birth. If the fetus passed quickly

thru the vagina, the chance of infection was much lessened. In one instance the first child of twins was infected, the second escaped it. He uttered a strong warning against the use of silver nitrat by the inexperienced; for these, 10% protargol was safer. In the cases at this institution the gonococcus was found in 60% to 65% of cases; in the nongonorrheal, the streptococcus was the only germ of serious import. He said the question of immunity to the gonococcus needed more study than it had yet received. Patients who had had one attack of gonorrhea were not rendered by any means immune thereby against another attack. He went fully into histologic questions and the technic of treatment, setting forth the statistics of the institution. He concluded by some remarks on the training of students and midwives.

Subsequent speakers dealt with the matter in the light of their experiences at the various large cities, and the opener replied, elaborating his views for combatting venereal disease, which was at the root of this trouble.

The meeting unanimously passed a resolution urging that teaching of students and midwives on this subject should be given in the institution.

H. Dickinson.

## CHICAGO OPHTHALMOLOGICAL SOCIETY

President, Dr. Alfred N. Murray.

March 15, 1920.

### Some Indications for Evisceration.

Dr. G. W. Mahoney in the first few years of practice in special work, wherever he found it necessary to remove an eye, did an enucleation in nearly every case. In many cases there was considerable deformity; and in children lack of development of the side of the face from which the eye was removed. He soon gave up this as a general practice; and in panophthalmitis with a septic distended eyeball and acute pain he felt evisceration was the operation indicated, not drainage or enucleation.

In staphyloma of the cornea following serpent ulcer, with a markedly protruding cornea which the patient was unable to cover or moisten with the eyelids, there was frequently breaking down in the center giving a very unsightly and troublesome eye and evisceration was indicated. In absolute glaucoma with recurring exacerbations of inflammation and pain, he always did an evisceration. In keratoglobus he had never been forced to the extreme of removing the eyes where both were involved. Where one eye was enormously distended, the distention increasing month by month, the sclera becoming more and more thinned, pain increasing, deformity more apparent, and the sclera in danger of rupturing, he had done an evisceration.

If a patient came with a perforating wound of the eyeball involving the ciliary body, the treatment was perfectly clear. It would make no difference whether the patient had vision in the eye or not, that eye should be removed, as there was the great danger of sympathetic ophthalmia any time after ten days to two weeks from the date of the injury. In the other classes where removal of the eye was necessary, he did an evisceration. The technic for the operation was described.

The author thought there should be no hesitancy in choosing between enucleation and evisceration in children, for certainly in children, when the entire globe is removed, the side of the face from which the eye has been removed does not develop as well as the opposite side, and the deformity increases as time goes on.

### Enucleation and its Substitutes from a Cosmetic Standpoint.

Dr. Harry Woodruff of Joliet, Illinois, thought the patient was entitled to lose as little as possible in personal appearance when an eye was lost. The question of deformity was not always secondary. Some patients, women perhaps, look upon the loss of an eyeball as a terrible catastrophe, from the standpoint of personal appearance; and would be willing to do

almost anything to have that operation performed in such a way that no one would be able to detect the deformity.

He had in mind a woman of middle age who had sarcoma of the choroid; and naturally enucleation was urged. She delayed for quite a while because, as she expressed it, she "would rather die than suffer the deformity." She finally consented, and the eye was enucleated in the ordinary manner. Unfortunately she did have a considerable deformity. She was given as good an artificial eye as he was able to get for her in Chicago, but she had so much depression of the upper lid that she wept over her personal appearance. Using Beck's syringe, and solid paraffin, he made two injections. In the first injection the quantity was not sufficient, but after putting in enough paraffin it filled out the ball so that with the Snellen eye she had a very much improved appearance. He had treated a number of these cases since with equally good results.

Before the Snellen eye came into common use, he had experience with the Mules' operation, and also with the operation of Frost, where glass balls were introduced into Tenon's capsule. The original operation of Mules', of implantation of a glass ball into the scleral cavity, if successful, gave a beautiful result. The objection to it was the fact that the operation must be an evisceration, and the general opinion seemed to be that evisceration was not entirely free from danger of sympathetic ophthalmia, at least, not to the extent that an enucleation was. There were few oculists who would do an evisceration, unless it was a necessity because of panophthalmitis, or of injury where enucleation would be quite difficult. He thought that this general opinion was the correct one. Sympathetic ophthalmia followed evisceration more frequently, perhaps because it was not thoroly done and uveal tissue was left. But even then there was certainly an argument against evisceration. He supposed that this was the reason why Frost and Lang abandoned Mules' operation and attempted to fill out the cavity after an enucleation by implanting a glass ball in the capsule of Tenon.

Another objection to both of these operations was the fact that the glass balls were extruded in many cases. The glass ball remained in place in some of his cases while in many it came out.

He had had experience with the implantation of fat, both from the gluteal region and from the abdomen. He attempted once to implant fat from the abdomen with the skin surface outward. The idea was to have a skin surface take the place of the cornea being sutured to the conjunctival edges, but the skin sloughed in his case and the fat also. He hardly knew whether all came out or sloughed away, but the convalescence of the patient was so delayed that it did not seem to him worth while.

He thought the proper and safe method to give the best cosmetic result was to perform enucleation, unless evisceration was necessary, suturing the muscles, capsule and conjunctiva together; and then, if one could get the cooperation of the artificial eye maker or dealer and get a good fitting eye, one could usually get a satisfactory result, except in a person who had little or no orbital fat. For unsightly sinking in of the upper lid, the method of injecting paraffin beneath the conjunctiva was used.

**Plastic Corrections in Slight Ectropion to Retain Glass Eye.**

Dr. E. F. Snydacker said there were two things he would like to speak about. For teaching purposes, by taking a wooden ball, using a few tacks, and a little chamois or leather, it was simple to demonstrate almost any plastic operation around the eyelids. He called attention to slight ectropion, where we sometimes had a little difficulty in using a prosthesis. With plenty of plastic skin on the upper lid, if there was slight ectropion of the lower lid, as after a burn or injury, necessitating taking out the eye, and this slight burn prevented the glass eye from fitting; when the skin was brought into the lower lid the double

purpose was served of getting ample plastic material to supply the other lid, and an orbicularis muscular effect in holding up the lower lid.

By going in with a keratome at the border of the upper lid, cutting off the layers at the outer border, undermining the skin of the upper lid, making a slight circular flap, following the lines of the orbicularis, one could get all the plastic skin needed to correct the defect and hold it in place, because the natural line of cicatrization extended up, against the pressure of the ectropion which was downward.

In a case of slight burn he was able to pull up the ectropion and not have the slightest deformity; the tongue-shaped flap held the lower lid up and kept it up.

Discussion.—Dr. George F. Suker could not agree with Dr. Mahoney in regard to evisceration. He would not do an evisceration under any consideration whatsoever. If an eye had to be sacrificed, enucleation should be done. The sclera, in evisceration lost a large share of its blood supply, and because of this, frequently underwent degeneration with calcification. Such a scleral cup would act as a foreign body and an irritable stump ensue, which must ultimately be removed. Such scleral cups often caused sympathetic irritation.

In 1898 de Schweinitz collected about a hundred cases of eviscerations and implantations of foreign bodies into Tenon's capsule, or scleral cup; and reported not one authentic case of sympathetic ophthalmia arising from the implantations. In quite a large number of cases sympathetic irritation had arisen from a simple evisceration, several cases of sympathetic ophthalmia had followed from Mules' operation. When one had to sacrifice an eye, sacrifice it in toto.

In the majority of enucleations the upper lid drooped because of the destruction of the sympathetic nerve supply coming from the lenticular ganglion; which was often destroyed, but ought not to be destroyed. Following the severance of the sympathetic fibers to the upper lid a sympathetic ptosis resulted, one of the symptoms of Horner's symptom complex.

There was one foreign substance which could be retained in the orbit and not be affected by the body juices, and that was lead-free glass. Any other metal, be it gold, silver or platinum would be affected, because the human body manufactures hydrochloric acid. But it does not produce any acid that could affect lead free glass, or silicon. A hollow glass ball (18 to 23 mm. in diameter) implanted into the capsule of Tenon, and with the preservation of the lenticular ganglion, gave an ideal result; both as to fullness of socket and range of motility of shell.

The sphere was never extruded after the stitches had been removed, provided no infection had been introduced and the sphere was of the proper size. A too large sphere would cause tension on the sutures, and they might give and allow the sphere to be cast out. Should this occur, repeat the operation under local anesthesia using a smaller sphere. The implantation of fat into Tenon's capsule was a nice procedure and yielded a good result; but care must be exercised not to insert fat that had been crushed. Again, should fat necrosis occur, as it sometimes did, it caused a long delay in healing, and the end result was only a shade better than a simple encleation.

As to paraffin, whether inserted as a sphere or injected when fluid into the prepared and sutured cavity, it would often disintegrate, disappear, or cause a paraffinoma. In implantations of any kind sufficient covering for the object implanted was an essential. The cone of the muscles should be brought over the sphere with a purse string catgut suture, and the conjunctiva sutured over this. There was no doubt then that it would be retained permanently. He had made many of these operations and up to date had not had any patients in whom the ball extruded, and some cases were operated on fully twenty years ago. He had had to take the sphere out when implanted into the scleral cup, because of an ir-

ritable stump or socalled sympathetic irritation.

Every operation about the face had two purposes: First, therapeutic, and second, cosmetic. There was no necessity for doing simple enucleations on patients, whether man or woman or child, when one could do an implantation. Sinking in of the upper lid was at a minimum with the preservation of the lenticular ganglion. After an enucleation in children, the bony orbit was not appreciably retarded in its growth. The apparent difference was due to the shrinking of the orbital contents, and this shrinking was immeasurably counteracted by an implantation of any sort. Postmortem measurements, years after the enucleation of children's eyes amply verified this statement.

He agreed with Dr. Woodruff that an evisceration might be performed when we had no other choice. The injection of paraffin some time subsequent to operation, was not a good surgical procedure, as any building up or filling out of the orbit could be done at the primary operation of enucleation.

The implantation of a glass sphere embedded in a layer of fat was the ideal implantation as it gave more of a cushion for the shell to ride on. Implant this into the muscle cone, bringing the latter together with pursestring suture and then bring the conjuctiva over this stump. As to size of the sphere to be used, usually one about ¾ to 4/5 of the size of the eye enucleated was chosen—one ranging from 18-22 mm. in diameter.

The objection to the various operations of implantation was that they took considerable time for healing. However, this was no valid objection. For several years past, he had been using an ordinary tonsil snare to sever the optic nerve after the globe was freed of its muscle attachments. The hemorrhage was practically nil, and this was of advantage as the subsequent reaction, edema and infiltration, were much less Relatively speaking, he had very little edema to contend with after implantation. If it were his misfortune to lose an eye, he would want an enucleation with an implantation into Tenon's capsule.

Dr. William E. Gamble should dislike to see the society go on record as throwing overboard evisceration. It had been his experience that in cases where one had panophthalmitis, the other eye did not become involved. It was only in the slow, chronic uveitis cases, that one had involvement of the other eye. In cases of panophthalmitis the danger of opening up the sinus at the back of the eye, and the very little danger of sympathetic disease made it, as he saw it, good surgery to eviscerate and poor surgery to enucleate.

Dr. Michael Goldenburg said that in cases of panophthalmitis he would neither eviscerate or enucleate. Panophthalmitis was nothing more or less than an abscess of the eyeball, hence the only surgical treatment indicated in an abscess was incision and drainage. Surgeons no longer cut out or curetted an abscess cavity in any other part of the body. It would seem to him that it would be contraindicated here more so than anywhere else. The impossibility of eviscerating and removing every vestige of choroid was apparent to every one. The opening of the many channels of exit in the acute stage, e.g. the venae vorticosae, the anterior ciliary veins, etc., was always a dangerous procedure. One could not tell if infection was or was not going to follow. In enucleation the same held true, probably even more so. The danger of sympathetic ophthalmia and meningitis must be remembered. The only surgical treatment indicated, in his opinion, was wide incision of the cornea, within the limbus so as not to open the canal of Schlemm. Keep this incision open wide to obtain free drainage; and after all inflammatory symptoms have subsided, and the wound had healed, wait three or four weeks and then enucleate. Evisceration in panophthalmitis was a procedure of yesterday. He had seen such cases followed by serious results.

He hoped Dr. Woodruff had better luck than other in injecting paraffin. Very recently he had seen a case of paraffinoma of the face, following in-

jection of paraffin for a deformity of the nose. It would seem that paraffin for no particular reason at times had the perverse habit of spreading all over the face.

Dr. Harry S. Gradle believed in evisceration of the eyeball except in intraocular tumor, which was an absolute contraindication to evisceration. The results of evisceration were so far superior to the results of enucleation, cosmetically speaking, that there was no comparison.

He was not particularly anxious to eviscerate in the type of irido-cyclitis that might lead to sympathetic ophthalmia, because he was not sure of the evisceration. But the absolute removal of all of the intrascleral contents was as sure a preventive against sympathetic ophthalmia as was enucleation.

He agreed with Dr. Gamble that evisceration in panophthalmitis was preferable to enucleation, not because of danger of purulent meningitis, but because a better cosmetic result was otained. The literature shows few cases of meningitis following enucleation. The first case was reported by von Graefe, but there was no autopsy. There had been eight autopsies of cases of meningitis occurring after enucleation, and in not one of these cases was there any continuity of the infectious process in any of the structures of the orbit. In other words, it would not have made any difference whether enucleation or evisceration had been performed, a metastatic meningitis would have occurred just the same.

For implantation he preferred fat. It was an autogenous substance that molded itself to the contour of the sclera or muscle cone. It was pliable. It was a live implant. It became readily vascularized and maintained its vitality. It must not be implanted in the presence of an acute infection, such as panophthalmitis because it would be extruded. In any other condition fat might be implanted after evisceration or enucleation.

Dr. Frank Brawley, in support of those who had advocated evisceration, called attention to the work of Dimitry, of New Orleans, who had done eviscerations of various sorts for twenty years. His present operation gave the best stump that had ever been obtained. (See v. 2 p. 653.)

Dr. Robert Von Der Heydt stated that three years after operation it did not make much difference whether evisceration or enucleation had been done, as the scleral tisue was practically gone after that time. Because of doing an evisceration he would not be afraid of sympathetic inflammation in the other eye. He used a large fenestrated scoop, such as the ear men use, for curetting the contents of the eye, removing all uveal tissue. He liked to see a free hemorrhage in removing the eye. It was nature's self-cleanser and had saved many a wound from infection, and could be controlled by hot bichlorid at any time.

Dr. E. F. Snydacker said he had done many fat implants in the last five years, and he had good results in some cases and indifferent ones in others. The fat implant principle was very much the same as the Lane bone plating principle. If there was infection the fat was of low resistance, and easily lost. One had to do an absolutely immaculate operation and had to put the fat in with absolutely no crushing and no handling. If one got it in right, as a plastic substance, the orbit could be filled up beautifully. While some was absorbed, all of it was not. His failures in fat implants were due to low grade infections, and since following an improved technic he had had better results.

He had seen eyes in which there was, or had been, gonorrheal ophthalmia, with sloughing of the cornea, and a chronic process set up after the accute process had subsided. In such cases he had been afraid of enucleation, and had always eviscerated. He had had three such cases that he could remember, and thought evisceration was a far safer procedure, in that it did not lead to any ill results. He was afraid of opening a communication with the meninges where an acute or chronic gonorrheal infection was present.

Dr. E. V. L. Brown said that evisceration did not remove the choroideal tissue, extending along the vortex veins in their course thru the sclera, and a good many cases of sympathetic inflammation had followed evisceration. He took issue with Dr. Snydacker's statement that sympathetic inflammation was not to be feared in the perforating gonorrheal ulcers of the cornea. He reported such a case in the Archives of Ophthalmology in 1906. The defect in Descemet's membrane was really small in these cases, and Fuchs contended small atria rather than large ones were found in sympathetic inflammation.

Dr. A. A. Hayden felt it was well for us to remember, even in enucleation done apparently early when no inflammatory signs were present, that occasionally a sympathetic inflammation in the opposite eye developed. This was true in a case that he saw with Dr. Gamble about nine years ago, which was presented to the society. Dr. E. V. L. Brown examined and sectioned the eye. The boy had a penetrating wound of the sclera, and on the ninth day after the injury enucleation was advised. This was done on the eleventh day with resection of one-quarter of an inch of the optic nerve. Healing was without event, but on the twelfth day, sympathetic inflammation developed in the second eye with loss of that eye. If he understood Dr. Suker correctly, he said that sympathetic inflammation did not develop after a well performed enucleation. He submitted this case, which was reported some years ago, as one in point.

Dr. Mahoney, in closing, said he could see no reason why, where there was a wide open sclerotic cup, it could not be cleaned thoroly if we took the time to do it. We then had the very best stump possible, and it was not necessary to implant anything foreign to take its place.

He recalled a case of a man who worked in the stockyards, who had sustained a frightful injury to one eye. The eye was enucleated the same afternoon, he thought about two and a half or three hours after the injury. He saw the man some four or five years later; he was totally blind in the other eye, and had been for two or three years. He had every indication of having had sympathetic ophthalmia in the other eye. The speaker had never had a case of sympathetic ophthalmia in his practice and he had done evisceration, in the class of cases he had mentioned, for twenty-five years.

There was one other point he would like to speak about atrophy or degeneration of the sclerotic. Within the last month he had a patient come to him whose eye was removed forty-two years ago by a very well known oculist in Dublin. This man had worn a shell eye all these years, occasionally removed it at night, and the cavity kept gradually filling in with hypertrophied tissue until he could not wear an eye. He came to him to see if he could do something for him to restore the cavity so he could again wear an artificial eye. He attempted to do that; he dissected out a large amount of tissue and implanted some Thiersch grafts. When he went deep into the cavity he came upon the sclerotic; it was white and firm and of ordinary thickness and looked perfectly normal as a fresh sclerotic would today. He removed a piece for examination. While this case did not prove anything, still this man carried the sclera of the eviscerated eye for forty-two years without any change whatever. He was sure evisceration was the operation to do in the classes of cases he mentioned; as it gave the best result.

Dr. Woodruff stated that if one had ever attempted enucleation in purulent panophthalmitis with terrific swelling of the eyelids and orbital tissues, he could speak from bitter experience. He had been taught to eviscerate such an eye, and thru reading just such a discussion as we were having now he finally came to the conclusion he should enucleate and not eviscerate. So the next case that presented itself of panophthalmitis, one of these terrific cases, he enucleated the eye, and it was one of the most humiliating experiences he ever had. It was an exceed-

ingly difficult operation; he made up his mind he would perform evisceration in such cases and not attempt to enucleate, since sympathetic ophthalmia was not apt to follow a purulent process. It was not the purulent inflammation that caused disaster; it was a proliferative uveitis. These were the dangerous eyes and one would be perfectly justified in not eviscerating such eyes.

Dr. Suker was very definite and positive in his ideas as to what to do in these cases, but he had not been able in all these years to get others to take up this idea. He (Dr. Woodruff) attempted to get lead-free glass, but he did not know whether he got it or not. The glass did not stay in in many cases, altho it did in others. The idea of fat implantation was better because fat was autogenous; it was a natural tissue of the body, and fat made the eye more prominent. So that if one could place an implant of fat and have it remain, it was the most natural sort of substitute for the eye. For old cases where the atrophy of the orbital tissue was great, the injection of solid paraffin was safe and satisfactory.

**Filaria Loa.**

Dr. William E. Gamble exhibited a specimen of filaria loa, and gave an abstract of the literature on the subject.

**Siderosis Bulbi.**

Dr. E. K. Findlay reported the case of a man, 39 years of age; occupation, structural iron worker. He came to the clinic March 9, 1920, on account of failure in vision of the left eye. He gave no history of injury or previous inflammation. In November, 1919, he noticed a change in the color of the left eye, and spots began to appear before the eye. Vision failed rapidly this last month, until now he had only light perception. Examination showed a pronounced yellow color of the left iris, while the right was a clear blue. The pupil reacted to light and accommodation, and when the pupil was dilated concentric brown pigment deposits could be seen on the lens, which was entirely opaque. An x-ray plate showed a foreign body in the vitreous chamber behind the equator.

Discussion.—Dr. Clark W. Hawley said: About twenty-five years ago, a man was hit over the eye with a flying bolt. He went to his work the next day after a surgeon had sewed up the wound. He had no trouble for over a year. Then the pupil dilated extensively. In the posterior portion of the eye was a white mass in which there was a small piece of steel. It had been encapsulated. He removed the piece of steel with the result of 20/20 vision.

Dr. William A. Mann reported two cases of similar character. The first case came to him for treatment of iritis, the patient having been under treatment for that condition. He found marked siderosis of the iris, and advised an X-ray, which showed a small foreign body just below the lens and apparently in front of it. Application of the magnet finally succeeded in pulling it out from below. The iris was stretched across the anterior chamber, but finally pulled loose. After a corneal section a small magnet extracted the foreign body, and the man recovered fairly good vision.

The second case was interesting because the man came to him and said, "My wife says my eyes do not look right."

There was marked siderosis and a dilated pupil. He stated that about four months before he got a piece of steel in the eye and the foreman took it out; but told him there was a piece of steel in the eye, altho he could not find the point of entrance, that down low on the iris there was a black spot. The pupil contracted under eserin, but did not show anything more. An X-ray was made and it showed a piece of steel in the same position as in the other case, below the lens at the root of the iris and in front of the lens, and it was suggested that the magnet be used. The patient was taken to the hospital, the giant magnet applied. At first there was no response, but by repeated applications of the full current it finally began to show a little bulging. Finally the steel was removed by the

magnet. There was no congestion following the operation. Vision was 20/20, and two or three weeks afterward the pupil was almost normal.

Dr. S. Luther McCreight stated that during the past four years he had seen thirteen cases of siderosis, and in only two of them would the pupil react. Verhoeff had pointed out that in these cases of siderosis bulbi there was a deposit of some nature in the sphincter muscle. There had been a good deal of controversy as to why these pupils did not react. From a pathologic standpoint, there was a great deal yet to be done in regard to these cases. In all the cases he had seen the pupils were immobile. All but two of the cases he saw had inflammation. He thought probably the nature of the foreign body had something to do with it.

Dr. Michael Goldenburg reported the case of a man, who received an injury to his eye about two years ago, to which he paid little or no attention until very recently, when he noticed that his vision in the eye was failing. After dilatation of the pupil with a mydriatic, he found a cataractous lens with typical siderosis spots all around the anterior surface of the periphery of the lens. Radiographs located a piece of metal 1 x 2 mm. in size back of the equator, and in the vitreous. The giant magnet was applied, but the patient did not experience any pain or pull on the make or break of the current. He then decided to make a triangular flap incision thru the sclera for direct attack. After accomplishing this, he inserted a small curved end piece with a hand magnet, and removed the piece of metal without any further difficulty.

**Optical Iridectomies.**

Dr. Robert Von der Heydt presented a boy, seven years of age, in whom he did bilateral optic iridectomies. Now the boy had vision of 20/50 in each eye. There were central cataracts. By that he meant a cataract which was much smaller than the so-called perinuclear or zonular cataract. This cataract was circumscribed and involved a small central area in the embryonic nucleus. All who had seen this case would agree that in a small central cataract such as this, iridectomy rather than needling was indicated.

Discussion.—Dr. Harry Woodruff said that many operators would have done the same as Dr. Von der Heydt did in this case. He remembered seeing a case of Dr. Beard's many years after he had done optic iridectomy. The man had gone on for years and had eventually developed cataracts. His vision had finally deteriorated on account of extension of the lens opacities, so that eventually he had to have cataract extraction.

If this case, which Dr. Von der Heydt had reported, had been his he would have advised a needling operation because after a successful needling the patient would have a clear round pupil which one could not obtain if one did zonular extraction; and therefore the chances of getting better vision than 20/50 would be very good.

Dr. Von der Heydt said that if he had a patient with a lamellar cataract and he had 20/70 vision he left him alone. Why should a needling operation have been done in this case? The patient was only 7 years of age. He was a little below the normal in mentality, therefore he could not accurately measure his visual acuity at this time. This cataract would not progress. It was circumscribed and fixed. If in the future he thought needling might be required he would then do it. He would keep the boy under observation. He thought a great improvement had been made in his case by the optic iridectomies.

Francis Lane, Secretary.

## COLORADO OPHTHALMOLOGICAL SOCIETY.

March 20, 1920.

Edward Jackson presiding.

**Recurrent Iritis.**

E. T. Boyd, Denver, presented a man of about 58 years who had been shown to the society in January, 1919, on account of recurrent attacks of iritis. In January, 1919, there was an attack with

many adhesions, broken up under treatment. This attack was recovered from in about five weeks. During a more recent attack all the teeth had been extracted, and the patient promptly recovered. In the current month of this year the patient had developed another attack in the right eye. Previous examination of the nose, throat, and accessory sinuses had been negative, and during the later attack this examination had been repeated with the same result. There had recently been some sort of inflammatory rheumatism. The latest attack had been accompanied by hypopyon occupying one third of the anterior chamber. Would it be advisable to do an iridectomy to prevent recurrences?

DISCUSSION.—Melville Black, Denver, suggested that Dr. Boyd should have the patient's prostate milked to ascertain whether it harbored an infection. If an infection were found there it should be treated with a vaccine made from the discharge. It was uncertain how much good an iridectomy would do, or how much harm.

**Lethargic Encephalitis.**

W. A. SEDWICK, Denver, presented a case of lethargic encephalitis, in a youth of 15 years. The patient's tonsils and adenoids had been removed about seven years previously, because of numerous attacks of acute tonsillitis. On December 1, 1919, the patient noticed that he saw double, and went to bed on account of not feeling well. The next day the diplopia had disappeared at the time of getting up but returned after a few hours. On January 1, 1920, he went to bed with a temperature of 102°, and was very sleepy and hard to arouse. He was at that time nervous and jerky. This condition continued for a week. During the second week the temperature had gone and the other symptoms lessened, except the diplopia. This was taken to be an attack of influenza. When first seen by Dr. Sedwick on January 17, 1920, the patient showed marked diplopia both vertically and horizontally, the left eye being turned up and in. There was ptosis of both lids, the left much more marked. The pupils were normal in reaction, and accommodation was not disturbed. The face was expressionless or mask-like. The patient fell asleep while sitting in the office, but it was not hard to arouse him. It was said that he would remain awake about five or ten minutes in a moving picture show, and then drop off to sleep. Apart from a possible very slight congestion of the capillaries of the fundi, the ophthalmoscopic examination was negative. The vision was normal with correction of a moderate astigmatism. At the time of reporting the squint was greatly lessened in the left eye, but the right eye seemed to turn in for the first time. The patient still tended to fall asleep.

DISCUSSION.—G. L. Strader, Cheyenne, Wyoming, had seen during the past two months an ex-soldier, the history of whose case was much the same as that of Dr. Sedwick's patient. The condition began with a high temperature and extreme headache, and the same lethargic condition. The left eye turned outward and upward. He had practically got well, altho once in a while experiencing a little diplopia. Depletion of the nasal tissues by suction after cocainization would produce improvement for a while. The patient had remained much better since resection of the turbinates and straightening of the septum had been done.

E. E. McKeown, Denver. Ten weeks ago a case came in complaining of blindness following la grippe. The patient stumbled over objects. The eyegrounds were negative, but the patient had since developed sleeping sickness. Special features of the case were that the patient was violent at times, and that he had a ravenous appetite.

**Ophthalmic Herpes Zoster.**

D. A. STRICKLER, Denver, presented a man aged 61 years who had a persistent corneal disturbance which seemed probably secondary to an acute neuralgic condition, perhaps herpes zoster. He was taken sick on December 23, 1919, with a chill followed by moderate rise of temperature. There was another chill December 24, and the patient was ill until January 3, 1920,

when he was taken to the contagious hospital with a diagnosis of erysipelas. After twenty-four hours, he was dismissed with the statement that the condition was not erysipelas, but some form of neuralgia. When first seen by Dr. Strickler on February 15, the cornea was hazy, especially in the lower half, and the eyeball moderately inflamed. There was photophobia. The vision of the right eye was 20/100, of the left 20/30. Under atropin, dionin, and high frequency current, the vision of the right eye on March 12 had risen to 20/30. There were three scars of blebs on the right forehead and scalp. Several corneal areas had from time to time become denuded of epithelium, and had healed slowly. The patient had never complained of pain in the eye.

DISCUSSION.—W. A. Sedwick, Denver, had had a similar case which cleared up under general treatment including tonics.

C. A. Ringle, Greeley. This is probably a trophic disturbance, and there will be a tendency for continued degeneration of the epithelium until the innervation recovers. By this time of course there will be more or less cicatrization.

Edward Jackson, Denver. The case is making fairly good progress. Altho the condition is probably of neurotrophic origin, the absence of pain would tend to rule out herpes zoster.

**Infection of Fat Implantation.**

A. C. MAGRUDER, Colorado Springs, presented a man who had lost his right eye as the result of a blow, and into whose orbit fat from the abdominal wall had been transplanted for prosthetic purposes. A severe infection with staphylococcus albus had developed simultaneously in the implanted fat, and also thruout the abdominal wound. The patient stated afterwards that any little scratch on the surface of his body would lead to pus formation.

**Choroiditis; Field Defect.**

J. M. Shields presented for W. M. BANE, Denver, a man aged 31 years who had come complaining of loss of vision in the upper portion of the left visual field. The vision was R. 5/4, L. 5/6. The right fundus showed a small pale area near the superior temporal vein, about a disc diameter from the disc. The left eye showed a larger area of choroiditis in the macular region, and two small hemorrhages between the optic disc and the macula. The shape of the area involved in the left eye corresponded closely to the blind area outlined by the perimeter, which extended from the center upward about ten degrees, and measured about ten degrees horizontally. The urine was negative with the exception of a very slight ring of albumin and a few casts. The history and other tests, including the Wassermann, were negative.

**Squint; Voluntary Nystagmus; Operative Aphakia to Blind One Eye.**

MELVILLE BLACK, Denver, presented a man aged 29 years in whom high hyperopia and convergent squint were associated with an extreme neurasthenia which had created special difficulty in treatment. In 1914, an eastern oculist had done one or two operations on the ocular muscles to correct the squint, and had given glasses for correction of the hyperopia. After the patient complained that muscle work had caused nystagmus and dizziness, the same oculist finally needled the lens of the right eye in order to put this eye out of use; but relief of the symptoms did not result. Later the lens became absorbed and the pupil partially clear. The patient professed inability to wear either correction of both eyes or correction of the left and a plano in the right. He maintained that when he relaxed his accommodation a very rapid lateral nystagmus of both eyes resulted but that he could control this nystagmus by concentration. Examination revealed that when he claimed to be relaxing he was really forcing his accommodation with an accompanying nystagmus, and that when his accommodation was relaxed there was no nystagmus. There seemed to be complete inability to persist with the hyperopic correction. The aphakic eye accepted + 16.00 sph ⌒ + 1.00 cy. ax. 90°, and the correction of the left eye was + 4.50 sph. ⌒ + 1.00 cy. ax. 90°

DISCUSSION.—H. R. Stilwill, Denver, had presented the same patient to the society in October, 1916. The man was at that time threatening suicide, and asked to have the right blinded, which Dr. Stilwill refused. Among the patient's nervous symptoms was a tendency not to pay his bills.

Edward Jackson, Denver, had also examined the patient at one time. The man was evidently from the first mentally unbalanced. With the ophthalmoscope, it was evident that while the eye was steady it was not accommodating. When he was moving the eye it was difficult to see the fundus, but the impression gained was that accommodation was active. Binocular vision is a very delicate nerve adjustment, and it is quite possible that the antipathy to single vision which Graefe called attention to may exist in this and similar cases. In some cases where the attempt is made to produce diplopia and then fusion with prisms, as the images approach they suddenly jump over to the opposite side.

E. R. Neeper, Colorado Springs, felt that if it were really believed necessary to put one eye out of commission, it would be far preferable to turn the eye to one side by a muscle operation, rather than to blind it.

WM. H. CRISP, Secretary.

# ABSTRACTS

**Lindahl, C. Transillumination for Diagnosis of Tumors of Choroid.** Uppsala Läkareföreningens Förhandlingar, vol. 25, p.1.

The author, in a well written and detailed article with many illustrations and colored plates, reviews the methods of transillumination of the eye; and describes a new one devised by himself, which he calls pupillary transiilumination of the scleral wall. He uses a Nernst light modelled after that of Gullstrand for ophthalmoscopy. The lamp gives a very small but concentrated pencil of light. In using it, the eye is turned toward the lamp, the light directed thru the pupil illuminating the sclera opposite from the inside.

A detailed account of the appearance of the normal sclera, calling attention especially to the ciliary region, is given. The presence of a tumor is shown by a dark area in the illuminated field. Tumors are much more readily seen than by other methods of transillumination. The lamp can also be used for ordinary transillumination to better advantage than the old lamps on account of its stronger light.

In suspected tumors of the posterior half of the eyeball he uses in addition two procedures: (1) The method of Gullstrand using his light and an ordinary Morton ophthalmoscope. (2) Illuminating the eye thru the sclera with the author's light and observing the suspected area thru the pupil with the ophthalmoscope. In a serous detachment of the retina, the detachment will appear red with dark vessels. If on the other hand the area, or a part of it, appears dark, there is present a tumor or blood back of the retina. These two methods will always give positive findings for a posterior tumor provided that the tumor touches or lies close to the retina at any place which can be observed thru the pupil.

**Dufour, M. Illumination in Ophthalmology.** Ann. d'Ocul., 1919, vol. 156, p. 648.

*Illumination of the eye for examination.* For examination of the cornea, aqueous, iris, lens, and vitreous, the best illumination is the Gullstrand lamp. Failing this, the metallic filaments of lamps of low voltage furnish a great brilliancy. Such a light is especially useful if aided by a lens with an iris diaphragm; and if there is behind it a concave mirror whose optic center corresponds to the position of the filament.

On the other hand, for *ophthalmoscopic work*, it is better to have a small surface brilliantly illuminated by a bright light placed behind it, all of the useless

rays being arrested by a screen, and to make the examination in a dark room whose walls will not reflect lights. Lamps with visible filaments must not be used because the filament is projected upon the retina and the illumination is not uniform, thus annoying the observer. The Gullstrand lamp can be used by employing a concave mirror of about 15 cm. radius of curvature, so arranged that the reflected rays are perpendicular to the incident ones. In order to avoid the corneal reflex, it is necessary to center upon the pupil the entire shadow cast by the hole in the mirror. The Gullstrand lamp can be replaced by focussing upon a slit by means of a spheric lens, the filament of a lamp of low voltage. By means of another lens, furnished with a diaphragm, this image is focussed on a small mirror or a small prism with total reflection.

*Illumination for the Operative Field.* The projector type as used by dentists has the disadvantage of leaving the hands of the operator and his instruments in the shadow. This is overcome by an instrument made by Zeiss, with three mirrors and three projectors. The disadvantage is the necessity for an arc light. The author and Verain have devised an instrument which they call the scialytic, which consists of an arrangement similar to that used in light-house lenses, around which are arranged 50 plane mirrors in the form of a regular pyramid. The light obtained is uniform and any opaque object coming into its field does not cast a shadow. If the oculist cannot obtain a scialytic, he can make a substitute by using two bars at right angles in their middle parts. On each of the four ends a projector is attached, which can be directed so as to illuminate the entire operative field. C. L.

**Stuckey, E. J., and Hughes, C. A. Trachoma Among the Chinese in France.** The China Medical Journal, v. 33, Nov., 1919, p. 522.

In the early drafts of Chinese coolies it was found that from 10% to 15% were suffering from trachoma when they arrived in France. This is surprising, because each coolie had been medically examined in China before embarkation, and those having trachoma were supposed to have been rejected. The six weeks on board crowded transports, however, provided ideal conditions for the dissemination of the disease.

One of the most striking features of the examination in France was the clear evidence of the infectivity of trachoma. The men were examined in the order in which they bunked on shipboard. Again and again a long string of men showed no trachoma and then suddenly a series of five or six would show infection. It was generally possible to pick out from among these men the one who was the source of infection to the others. His would be a well marked case of chronic trachoma, while the other cases showed the trachoma granules in the beginning stages.

For the purpose of segregation and administration, the Chinese were divided following their examination in France into three classes:

Class "X", men with healthy conjunctivas.

Class "Z", cases of manifest trachoma.

Class "Y", cases of chronic conjunctivitis, or the border-line between "X" and "Z."

The men of Class "Z" were formed into companies and sent to special "Ophthalmic Treatment Centres," e. g. Calais and Boulogne, where they were constantly under supervision and treatment by ophthalmic specialists.

The men of Class "Y" were kept under treatment at the encampment hospital until they could either be diagnosed as free from trachoma, when they were transferred to "X" companies, or as infected when they were sent to join the "Y" companies at the Ophthalmic Treatment Centres.

As soon as the heavy incidence of trachoma in the early drafts was recognized, instructions were cabled to China to require a stricter examination of the eyes of all recruits and to reject

all men suffering from conjunctivitis. The "standard drops," zinc sulphat two grains to the ounce, were also ordered to be instilled daily during the voyage into the eyes of all the coolies. As a consequence the trachoma rate at once sank to 3%, and later to 1.6%.

The routine treatment of all cases with acute symptoms was to paint the everted lids with a 2% silver nitrat solution; of all chronic cases with copper sulphat. For a change of treatment, glycerol of a tannic acid (1-8) was used.

For prophylactic reasons the standard drops were ordered instilled into the eyes of all the Chinese in France. All face towels were ordered sterilized by boiling twice a week. Periodic inspection of all "clean" companies was also undertaken. The result of all these measures was very gratifying to all those concerned. H. J. H.

**Harboe, Johan Fr. Methyl Alcohol Amblyopia.** Norsk Magazin for Laegevidenskaben. Vol. 81. No. 4. P. 379.

The author gives what seems to be the first report of methyl alcohol poisoning with amblyopia that has appeared in Norwegian medical literature. While Norway has made consistent efforts to limit the use of alcoholics, it has never entirely forbid their sale. This fact may explain the rarity of wood alcohol poisoning. The article describes in detail the progress of a case, which resembles in general so many that have been reported in American literature.

The patient, a man of 24, drank about 10 cc. of methyl alcohol diluted with four times the amount of water on Aug. 5th, 1919. The 2nd day headache, nausea, and vomiting; the 3rd day a beginning diminution of vision, which fell on the 4th day to perception of light in the left eye and counting of fingers in the right. After the 9th day the vision began to improve. On Sept. 19th vision in the right eye 5/7.5, left eye 5/7.5; fields normal for white; perception of red and green doubtful; paralysis of accommodation both eyes; papillae slightly pale.

On Dec. 15, 1919, vision somewhat poorer than in Sept.; papillary pallor increased; blindness for red and green and paralysis of accommodation still present; central scotoma in left eye.

**Moreau, F. Action of Emetin upon the Eyeball.** Ann. d'Ocul., 1920, v. 157, p. 3.

A patient, who awoke with intense pain in the eyeballs, like needles, apparently had normal eyes, but showed with fluorescein, small, central, superficial corneal ulcers. Under lavage, the condition disappeared in two days. Interrogation showed that the patient, a physician, the day before, while making an injection, received a few drops of emetin in his face. Experiments on rabbits showed one violently affected, the other not at all. In 4 men, one was unaffected, and the others in varying degrees. The author refers to the case of Robinson. (A. J. O., April, 1918.)

C. L.

**Gerard, Georges. The Curability of Trachoma by Naphthol-camphor-oxid.** Ann. d'Ocul., 1919, v. 156, p. 747.

The solution should never be applied fresh. Two parts of camphor to one of naphthol are gently warmed, filtered and allowed to stand in a white flask until it has the consistency of syrup and a brownish color. A detailed description of the method of its application is given, consisting essentially of everting the lid and protecting the cornea by a fold of cloth. Pain is present immediately, also recurs some hours later. There is considerable injection and lacrimation. Applications are made 2-3 times a week, being supplemented by the use of either a 1% to 2% solution of tincture of iodin in water, as compresses 3-6 times a day, or increasing strengths of zinc chlorid (1-2,000 to 2%) 1 to 3 drops in the eye in the evening. There is immediate improvement in the acute forms, and the cases are cured without any scarring. The chronic types are also improved but the improvement is not so rapid nor so constant. C. L.

**Magitot, A. Retinal Vascular Pressure in Posthemorrhagic Blindness.** Ann. d'Ocul., 1919, v. 156, p. 666.

The author observed the following in his case. (1) There was a disassociation between the general and retinal pressure, the former gradually increasing up to the 39th day, while the latter, at first very low, rapidly increased and attained the normal amount on the 26th day. Incidentally, the optic atrophy increased from the 9th to the 26th day. (2) The venous pulsation being spontaneously and almost continually present, the minimal pressure was evidently about the amount of ophthalmotonus. (3) The venous diastolic and systolic pressures were very nearly the same. Simply touching the eyeball caused the central vein to disappear. (4) The optic atrophy was probably due to the fact that the general blood pressure was hardly strong enough to force the blood into the eye. The history shows a sequence of hemorrhage, syncope, deafness, and blindness, followed by return of consciousness, and audition, with only partial restoration of sight. (5) Blindness could probably have been prevented if the patient had been kept with her head low, possibly in the Trendelendurg position, and if injection of serum or adrenalin had been used to cause increase in blood pressure. C. L.

**Terson, A. Equatorial Ophthalmotomy in Recurrent Glaucoma.** Ann. d'Ocul., 1919, v. 156, p. 528.

The author reports a case upon which a bilateral iridectomy had been performed. The beneficial results obtained, however, were only temporary, and he later performed a T shaped equatorial sclerotomy on both eyes with resulting visual acuity, R. 0.1, L. 0.2. With convex and cylindrical lenses, the patient was able to read newspaper print. Tension became normal and other symptoms disappeared. This result has remained permanent. Pilocarpin has been used every other day, as a precautionary measure. A brief discussion of sclerotomy in glaucoma is given. C. L.

**Duhamel, A. Use of Elasticity of Vessels in the Treatment of Ptosis.** Ann. d'Ocul., 1919, v. 156, p. 615.

The author treated a case of congenital ptosis by the following method, obtaining an almost normal function. A cutaneous incision was made 3 1/2 cm. long, a little below the inferior border of the orbital ridge. Dissection and isolating of a vein about 3 cm. long was effected. By means of catgut the two ends were fixed to the inferior border of the frontal muscle; and the top of the loop to the upper border of the tarsus, thru a buttonhole in the orbicularis. Resection of a small cutaneous rectangle was made and suture applied. C. L.

**Lindgren, E. Case of Mikulicz Disease.** Hospitalstidende, vol. 63, p. 18.

The patient, a girl of 12, gave no personal or family history of tuberculosis. There had been a mild fever for 5 or 6 days. Examination revealed a hard, indolent swelling of both tear glands, and a corresponding swelling of all the salivary glands, especially the parotid. Besides all palpable lymph glands showed some swelling. Spleen and liver normal; von Pirquet, negative,—hemoglobin 80%. The condition of the glands remained constant. The anemia increased steadily, swelling of spleen and liver appeared with a heart murmur, and death followed after a course of seven weeks. D. L. T.

**Lapersonne, F. de, and Sendral. Results of Ligation of Common Carotid in Traumatic Exophthalmos.** Arch. d'Opht., v. 36, 1920, p. 8.

These authors point out that the mortality from ligation of the common carotid has been always less when the operation was performed for traumatic exophthalmos than when done for any other purpose, 7% as against 38% of all cases and 54% for ligature to check hemorrhage. Since the development of asepsis the mortality has still farther declined.

They report two cases treated in this manner. One was of monocular late exophthalmos following traumatic aneurysm of the internal carotid. The

man, aged 37, was injured by fragments of a shell. Forty-five days after the injury the right eye was prominent with chemosis, enlarged conjunctival vessels, and obstruction of the veins in the retina. A month later there was a detachment of the retina of the left eye and increase of the original symptoms. At the end of two years and ten months the right common carotid was tied. Forty days later the patient was free from bruit, prominence of the eyeball was very slight, the conjunctival vessels were still a little swollen and varicose and the venous circulation of the retina had not returned to normal.

The second case was one of bilateral traumatic exophthalmos due to arteriovenous aneurysm by rupture of the carotid in the cavernous sinus. The exophthalmos had appeared 48 hours after fracture of the base of the cranium. Two months later there was marked double exophthalmos, greater in the right eye, total ophthalmoplegia, and ptosis, chemosis and ectropion of the right lower lid, with the usual physical signs of aneurism. Four months after injury the right common carotid was ligated, causing slight improvement. Five months later the left common carotid was ligated without causing serious cerebral symptoms. The result was very satisfactory and twenty-two months after the second operation vision had improved so that the patient could write with ease. There was little bruit, movements of the eyeballs were partially restored, and cerebral symptoms were absent.

These authors think that ligation of the common carotid is the treatment of choice for such cases. They make no mention of ligature of the orbital veins, which has also proved successful.

E. J.

**Rochon-Duvigneaud. (Institute of Ocular Physiology.)** Ann. d'Ocul., 1919, v. 156, p. 313.

The author, on behalf of his committee, made a report to the Societe d'Ophtalmologie de Paris and to the Societe francaise d'Ophtalmologie, advising the establishment of an institute of the character of l'institut Pasteur. It should consist of a laboratory for physiology of the eyeball (tension, for ophthalmic biology, human and comparative anatomy and histology, for physiology of the eyeball (tension, circulation, innervation, retinal function), for experimental surgery (grafts, regeneration, fistulization, etc), and finally for bacteriology. In addition, there should be sufficient radiologic and photographic equipment. There should be a permanent scientific personnel and space for men desiring to do research work. This would create a nucleus around which would grow a worthy institution.

C. L.

**Holm, Ejiler. A case of Atrophic Uveitis.** Hospitalstidende, vol. 63, No. 11, p. 13.

The patient was a woman of 48 with symptoms of a beginning glaucoma of the right eye. The symptoms increased and an Elliot operation was done with technically good results. But after about three weeks the vision had disappeared and the eye had to be enucleated. The case acted in many respects like a socalled malignant glaucoma; but microscopic sections showed an excessive atrophy of the whole uveal tract.

D. L. T.

**De Carvalho, J. P. Treatment of War Mutilations of Lids by Autoplastic Method of Snydacker—Morax.** Ann. d'Ocul., 1919, v. 156, p. 597.

The author describes the technic, and gives 3 cases in detail, with report on a total of twelve other cases. His first case was one of nasofacial and orbital mutilation, with orbitonasal fistula. Seven operations were done without success. Finally the Snydacker-Morax operation was performed with good result, but some suppuration from the orbital cavity persisted. The second case was one of anophthalmia and cicatricial ectropion, in which a good result was obtained. The third case was also anophthalmia and cicatricial ectropion, complicated by nasal fistula, in which the result was good, but allowed the use of only a small prothesis.

C. L.

# American Journal of Ophthalmology

Series 3, Vol. 3, No. 8 August, 1920

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY



Original papers and books for review may be sent to any member of the editorial staff. Reports of society proceedings should be sent to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Ill. Correspondence, and other scientific communications should be addressed to the Editor.

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AMERICAN JOURNAL OF OPHTHALMOLOGY, 7 West Madison St., Chicago, Ill.

## ADOLF ALT.

Dr. Adolf Alt, for 34 years editor of the American Journal of Ophthalmology, died at his home in St. Louis, June 28th, 1920. For many months he had been very ill and his recovery not expected. His last published article was his account of his own American Journal of Ophthalmology, published in volume 1, p. 146 of this Journal, more than two years ago.

He was the son of Dr. Dittmar Alt of Mannheim, Germany, and studied medicine at the University of Heidelberg, taking his degree there in 1875. He soon determined to cast his lot in the new countries across the sea. Going first to Canada, he became a member of the College of Physicians and Surgeons of Ontario in 1877; and Lecturer on Ophthalmology and Otolaryngology in Trinity Medical School, Toronto. In 1880 he published the first edition of his Lectures on the Human Eye, in which a large proportion of the 95 illustrations are devoted to the anatomy and pathology of the organ. His many contributions to his journal dealt largely with pathology. His work on pathology helped to give value and importance to the clinical observations of many of his colleagues, and to make a reputation for American science among European ophthalmologists, who at one time thought rather contemptuously of "practical" papers written in America, altho some of their ideas they have since adopted.

He settled in St. Louis in 1885. He soon won and retained the confidence and respect of leading ophthalmologists of his newly adopted country. When in 1884 he started the American Journal of Ophthalmology, he gathered as collaborators a group of well-known American ophthalmologists, who gave him active literary support for many years. This was the first monthly ophthalmic journal published in America, and the third in the world. He encountered a skepticism that thought it "preposterous" to try to publish an ophthalmic journal in the western part of the United States, but held his course and, with such assistance as he could get, put out a series of volumes to which the student must go to find many valuable observations.

He continued loyal to the scientific interests of the West. He became a member of the American Ophthalmological Society in 1882, but only once, in 1899, did he contribute to its program. On the other hand he took an active part in the organization of the Western Ophthalmologic and Otolaryngologic Association in 1896, was its first president, and the only one who held that office two succeeding terms. During its early years he published the ophthalmic portion of its proceedings in his journal, and had them reprinted to enable the Society to put out an annual volume of transactions. When the association was reorganized in 1903 under the name, American Academy of Ophthalmology and Otolaryngology, and began to publish its own transactions, he continued his active interest and support of its meetings. He also attended and contributed to the scientific program of Western Meetings of the American Medical Association, being chosen chairman of the Section on Ophthalmology for the meeting of 1911.

Thru a professional life of 45 years, Dr. Alt continued a quiet, unobtrusive, steady worker in ophthalmic science, a sound professional adviser, a serious, intelligent teacher, a worker for the organization of his profession, and a contributor to its permanent fund of knowledge. E. J.

## THE STUDY OF BINOCULAR DIPLOPIA.

Double vision is a symptom so disturbing to the patient and of such varying significance as to mechanism, etiology, prognosis, and treatment, that it is worthy of more systematic and detailed study than it often receives. Even in the larger text books the detached, fragmentary, incidental references to it are not in keeping with the importance it has in the patient's mind, or the need there is to make it the subject of a definite investigation.

From the account the patient gives of his seeing double, it is often possible to guess with great probability the nature and significance of the diplopia he complains of. But there is no reason for the ophthalmologist to guess, when by application of established methods of examination, he can know the form and importance of the symptom he has to deal with.

The first step is to ascertain if the diplopia is "monocular" or "binocular," by covering one eye and finding if the doubling of images disappears. Each eye should be covered in turn. It is possible for one eye to present a "monocular diplopia" while the other is quite free from any such fault. In such a case, covering the defective eye promptly ends the double vision and gives the impression that the diplopia is binocular. But covering the good eye leaves the diplopia unaffected, and reveals its "monocular" character. This alternate covering of the eyes shows us if the diplopia is "monocular" or "binocular"; but this is only the beginning of a proper study of the symptom in any given case.

The next step is to identify each of the images with the eye to which it belongs. To do this we must first get into relation with the patient's understanding and description of the two images he perceives. They may be distinguished as "right" and "left," "upper" and "lower," "straight" (vertical) and "twisted" (oblique), or "distinct" and "faint." But it is essential that some plan of distinguishing between them shall be mutually agreed upon, and understood by both surgeon and patient. With such an understanding there are various ways in which each image may be connected with the eye to which it belongs.

The simplest way is to cover one eye and have the patient tell which image disappears. If the images are sufficiently separate, and have a definite constant relation to one another, and the patient is an accurate observer and there are no complicating conditions, this method gives the desired information very quickly and without any special apparatus. But several conditions are apt to detract from its value. If the images are not clear and fully separated it may be difficult for the patient to decide which disappears when an

eye is covered. Many patients are not good observers, and even repeated trials yield answers of uncertain significance. Superior visual acuity in the eye with a paralyzed muscle may cause it to fix the object when both eyes are in use. But when the fixing eye is covered the other eye quickly shifts to fix the object in its true position and this may give the impression that its image is the one that has been suppressed.

The above liability to error is associated with the necessity for determining the relation of the images during the instant that one of them is being eliminated. It is removed by giving the patient plenty of time to compare the two images, as when one is distinguished from the other by placing a red glass before one eye. When one image is recognized as red and the other as white, the former is known to belong to the eye with the red glass before it; the identification is readily confirmed by covering one eye, and the relative positions of the two images can be repeatedly observed and described by the patient until all uncertainty or chance of error is removed.

The red glass test is most satisfactory when the object fixed is a fairly bright white light with a dark background, and when the visual acuity of the two eyes is about equal. If one eye sees better than the other, we place the red glass before the better eye, or in other ways reduce its visual acuity to about that of the worse eye, at the same time making it easy to see both images by using a bright source of light with a dark background. Where diplopia is artificially produced by use of a strong prism, the direction in which the base of the prism is turned serves to identify the image displaced in the opposite direction, as belonging to that eye.

It is also possible to identify the image by covering one eye with a strong convex glass, and thus blurring one while the other remains distinct. This is a method sometimes found convenient where a dark room and clear light are not available for the red glass test, and it is applicable at the reading distance. A star or letter or a short word is traced on the center of a sheet of paper. If the eyes are about emmetropic, a convex 3.D. is placed before one eye and a convex 6.D. before the other. With the paper held at a distance of 12 or 15 inches, one eye will see the test clearly, and the other so indistinctly as to make the identification easy.

The third step in the diagnosis of diplopia is to determine the amount of separation of the two images and how this varies in different parts of the field of fixation. In some ways the separation of the images is measured most simply by the strength of prism required to fuse them, and this method at least gives information regarding the extent of the obstacle to single binocular vision. It does not, however, indicate with certainty the real separation of the visual axes in the position of rest or greatest relaxation. This is better measured by one of the methods that eliminate all effort to secure fusion, as the parallax test, where the eyes are alternately covered and the apparent jump of the light looked at is reduced to nothing by prisms before the eyes, placed so as to "correct" the diplopia. It may also be measured by the phorometer method—making fusion impossible, and then ascertaining what prisms are required to bring the two images in the same vertical or horizontal plane.

Where the separation of the images is fairly constant, and the patient sufficiently observant and intelligent, the tangent scale of Maddox or Ziegler gives a rapid and fairly accurate method. With it the image belonging to the deviating eye is oriented on the scale, and the patient himself reads off the amount of his deviation. This requires enough general illumination to read the figures on the scale with the fixing eye. But the observation can be facilitated by using a specially brilliant test light seen against a dark uniform background, and shading the deviating eye so that the figures of the scale will be invisible or very faintly visible to it. One can prepare such a scale for himself of a size to suit the place it is to be used. A distance of the scale from

the patient of one meter or more, is sufficient for ordinary purposes.

Finally the variations in the separation of the two images in different parts of the field of fixation should be studied. For this our methods give only approximate results but these serve the practical purposes in view. The limits of the field of fixation can be accurately determined subjectively, only by the trained observer after repeated observations. For patients it is better fixed objectively with the corneal reflex test, and no way has been worked out for measuring at the same time the separation of the patient's double images. Complete fixation of the patient's head is very difficult to get when his eyes are turned as strongly as possible in first one direction and then another.

For practical, approximate methods, the patient's head may be fixed with chin rest and biting fixation, or the surgeon's hand placed on it, and the test light carried successively into various parts of his visual field, while he states whether the images separate more widely or tend to come together, either vertically or horizontally, or tend to become more nearly parallel or more oblique. Or, with the test light fixed directly in front of the patient, as it is used in testing muscle balance in the physiologic primary position, the patient's head may be turned in different directions and the separation of the two images actually measured by prisms. Thus the head being turned strongly to the right, the effect produced on the diplopia is that of turning the eyes to the left, throwing the head far back is equivalent to looking down; and so for all parts of the field. This measurement of the separation of the images in various parts of the field should be made in every clinical case of diplopia, or decided heterophoria.

It will be noted that in this discussion of the subject no mention has been made of the "true" or the "false" image. With the data before us obtained by the methods mentioned, the discrimination between the two, or between the "fixing" and the "deviating" eye is readily made by a simple process of reasoning from known physiologic data. Like other reasoning about our cases, it is only valuable as based on accurate observations, and should be deferred until the observations have been carefully made. The emphasis placed upon discrimination between the "true" and "false" images comes down to us from a time that squint was imperfectly understood; and fixing attention on it prematurely hinders rather than helps the diagnosis.

E. J.

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## EXAMINATIONS AND CASE RECORDS.

The American Board for Ophthalmic Examinations will hold its next examinations at Kansas City, October 13, the day before the meeting of the American Academy of Ophthalmology and Otolaryngology. These are the first examinations of the kind that have been held west of the Mississippi. They are also the last that will be held before the requirement of the Academy, and of the American Ophthalmological Society goes into effect, that candidates for membership in those organizations shall have the certificate of the Board.

The case reports demanded of those seeking this certificate have become a most important part of the examination, and in some instances no farther examination is required. These case reports must be submitted at least sixty days before the date for the examination. This may seem a rather long period, but it is quite short enough. In connection with the examinations at New Orleans in April, there were about 600 case records to be critically read, and rated. When it is remembered that these records have to be sent from one place to another to reach the different examiners, it can be understood that the requirement is quite necessary.

These case reports should not be of rare and interesting cases, but of a wide variety of the more usual cases, carefully worked out. They should

show especially the candidate's methods of diagnosis and treatment; the features in the case that justify a certain diagnosis or therapeutic procedure, or which negative a conclusion that other features of the case seem to indicate. If the case is reported because it has been operated on, the report should show, beside the reasons for operation, the methods of preparing the patient, and instruments, the exact steps of operation, the after treatment, and especially the end result.

Many men have had their methods of case taking and recording greatly improved by the "paper work" they have been compelled to do in military service. But all would be benefited by giving additional thought and attention to the subject. A good case record presupposes a good understanding of the condition, and a good grasp of the particular case. If the emphasis laid upon them in connection with ophthalmic examinations leads any ophthalmologist to greater thoroness in regard to them, his effort will have been wisely expended. E. J.

## BOOK NOTICES.

**Wilbrand, H., and Saenger, A. Die Neurologie des Auges. VII Bd. Der Erkrankungen der Sehbahn vom Tractus bis in den Cortex.** Large 8 vo. 630 pages, 1 plate and 371 illustrations in the Text. Bound in Paper. Wiesbaden: J. F. Bergmann, 1917.

This handbook for neurologists and ophthalmologists begun in 1900 is nearing completion, the early issue of the final volume being now promised. The volumes already published include over 4,000 pages; and constitute a great storehouse of information regarding the neurology of the eyes.

The subjects considered in the several volumes are: I The Nervous System and the Eyelids. II The Nervous System and the Lacrimal Apparatus, Conjunctiva and Cornea. III The Anatomy and Physiology of the Optic Tracts and Centres, and the General Diagnosis and Symptomatology of Visual Disturbances. IV The Pathology of the Retina, and Diseases of the Optic Nerve Head. V The Diseases of the Optic Nerve Trunk. VI The Diseases of the Chiasm. VII The Diseases of the Optic Paths from the Tracts to the Cortex. Volume VIII will treat of the Eye Muscles, Pupil and Accommodation.

A fair understanding of the scope and contents of this colossal work may be obtained from an inspection of this volume. It is calculated to give one a sense of the vastness of the subject, and of the impossibility of mastering all parts even of ocular pathology.

This seventh volume of the work opens with some general discussion of homonymous hemianopsia, and then takes up various types of this condition of which it distinguishes thirty. First comes complete hemianopsia, subdivided into typical, complete half blindness, and hemianopsia of the color fields. Then under incomplete hemianopsia we find 14 different types, including hemianopic central scotoma, 9 forms of quadrant hemianopsia, sector defects, zonular defects, and island defects in the field. Then double or bilateral homonymous hemianopsia is taken up, the cases being classified under 9 types, including hemianopsia for colors, central hemianopic scotoma, and various quadrant anopsias. Next loss of the general field of vision with retention of some insular part is considered, and of this six types are recognized, most of them produced by complete homonymous hemianopsia on one side, and incomplete on the other.

The etiology of homonymous hemianopsia next claims attention. First the infections are taken up, beginning with syphilis, then the poisons, multiple sclerosis, parencephalitis, pseudobulbar paralysis, and tumors, the last occupying 40 pages; then brain abscesses, injuries to the skull, gunshot wounds, disease of the vessels of the brain, and cerebral softening.

The occurrence and course of homonymous hemianopsia next claim attention; and then the prognosis both as to visual impairments and disturbances of orientation. Other sections

deal with mind-blindness, the diagnosis of hemianopsia including the diagnosis of localization under many subheadings. The volume is completed by a bibliography of 1263 titles, an alphabetic index of subjects, index of author's names, and an appendix of 25 pages setting forth the author's views on the organization of the cortical visual centers.

To illustrate the way in which the subjects are handled, we take the section under etiology, headed homonymous hemianopsia with syphilis, 17 pages. This is divided into syphilis with vascular disease, with softening, with basal gummatous meningitis, with gummatous tumors, and with paralysis. In the page and a half given to gummatous tumors we find abstracts giving the important features of 7 cases bearing upon this subject, references being given to 3 other cases described in connection with other subdivisions of the topic. Almost every page is crowded with such abstracts arranged to focus the information they contain upon the special topic under consideration.

One who has not examined this work in detail cannot conceive of the enormous accumulation of clinical experience it represents, and the information is drawn from widely scattered sources; almost 10 per cent of the references are from American publications. The industry and intelligent direction that have brought together and arranged so much of this department of knowledge are worthy of high appreciation and respect. E. J.

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## BIOGRAPHIC SKETCHES.

THOMAS H. SHASTID, M.D.,

SUPERIOR, WISCONSIN.

CALLAN, LEWIS WHITE. This well known New York ophthalmologist, son of Dr. Peter A. Callan, was born in New York City Sept. 4, 1877. He went to Yale College, but did not graduate. His M.D. was received at the University of Pennsylvania in 1901. Having studied ophthalmology at the New York Eye and Ear Infirmary till 1902, he practised as ophthalmologist in New York City from that time till his death. He was, for a number of years, ophthalmic surgeon to the New York Eye and Ear Infirmary, St. Bartholomew's and Lying-In Hospitals. He was a Fellow of the New York Academy of Medicine, a member of the American Ophthalmological Society. He was a tall, lean man, of fair complexion, and with blue eyes and light hair. He was a member of the Yale Club, the Calumet Club, and of various golf associations. He died at the Yale Club, New York City, Jan. 21, 1920, of pneumonia, leaving a widow but no children.

CONNELL, EDWARD JOSEPH. An ophthalmologist and otolaryngologist of New York City. Born in New York City May 1, 1876, he received his medical degree at Cornell University Medical College, in 1899, and practised as ophthalmologist in New York City from that time till his death. He was assistant otologist to the Lincoln Hospital, assistant ophthalmic and aural surgeon at the Fordham University Dispensary. He was a rather tall, lean man, smooth-faced, of a ruddy complexion, and with blue eyes and black hair. He was very quiet and retiring in disposition. He married, on Dec. 21, 1912, Frances Helene Tucker, by whom he had one child, Loraine Frances. He died of pneumonia, April 11, 1920.

PITTS, BARTON. A well known ophthalmologist of St. Joseph, Mo. He was born in Accomac Co., Va., Oct. 17, 1859, son of Edward Parker, and Mary Robertson Dennis, Pitts. His medical degree was received at the University of Maryland, Baltimore, in 1881. For a very short time he engaged in general practice in Virginia, then removed to St. Joseph. Here, as it seems, he practised from the beginning of his residence the eye, ear, nose and throat alone. He was, for several years, Professor of Ophthalmology at Ensworth Medical College. He married, April 18, 1895, Edna M. Steele. To the union were born two children, Mildred Steele and Beverly L. The Doctor was a large, stout man, a brunette, with dark grey eyes and iron gray hair. He was

a very sociable and kindly man, a Democrat, an Episcopalian. He died of heart disease, Mar. 10, 1920.

REYLING, FREDERICK THOMAS. A well known ophthalmologist and otolaryngologist, as well as teacher of histology, pathology, bacteriology, and some other branches. He was born in Havana, Cuba, Dec. 29, 1859, son of George and Catherine Esterina Muro, Reyling. He came to New York when a boy, and received a liberal education at the University of New York, at which institution, in 1884, he received also the M.D. After a brief period of general practice, he studied the eye, ear, nose and throat, and from that time forward practiced as a specialist in those branches. For a time he was Professor of Pathology at his alma mater, and Professor of Materia Medica and Therapeutics in the New York College of Comparative Histology and Veterinary Surgery, as well as visiting ophthalmic surgeon to the Manhattan Eye, Ear, Nose and Throat Hospital.

In 1896 he removed to Kansas City, Mo. Here he practised as ophthalmologist and otolaryngologist, but was also, from 1899 to 1901, Professor of Histology and Pathology in the University Medical College, and, from 1901 to 1905, Professor of Histology, Pathology, and Bacteriology in the Kansas City College of Physicians and Surgeons.

Dr. Reyling was a small, lean man, of a fair complexion, but with dark brown eyes and black hair. He was very quiet, in his manner, a man of few words but many friends.

He married a Miss Bertha Weisser, by whom he had five children, Catherine, Fred, Sophia, Leo, and Clemence.

The doctor died, Feb. 24, 1920, after a week's illness from pneumonia.

RISLEY, SAMUEL DOTY. A famous ophthalmologist of Philadelphia. He was born at Cincinnati, O., Jan. 17, 1845, son of John S., and Mary Parker, Risley. His medical degree was received at the University of Pennsylvania in 1870. For the next two years he engaged in general practice. Having studied the eye at the Wills Eye Hospital and at the University of Pennsylvania under William F. Norris, he engaged, in 1872, in the practice of diseases of the eye exclusively.

He was Lecturer and Assistant Surgeon in ophthalmology at his alma mater from 1872 to 1879; professor of diseases of the eye in the Philadelphia Polyclinic from 1886 to 1900, and emeritus professor thereafter; attending surgeon to Wills Eye Hospital, Philadelphia, 1890; a member of the board of managers of the Pennsylvania Training School for Feeble-Minded; alumni manager of the University of Pennsylvania Hospital since 1896. He was Chairman of the Section on Ophthalmology of the American Medical Association in 1893, a member of the House of Delegates in 1907, President of the American Academy of Medicine in 1891, Chairman of the Ophthalmological Section of the College of Physicians of Philadelphia in 1904 and of the American Ophthalmological Society in 1907. He was a member of the International Congress of Ophthalmology at Edinburgh, Scotland, in 1894, and at Utrecht, Holland, in 1899.

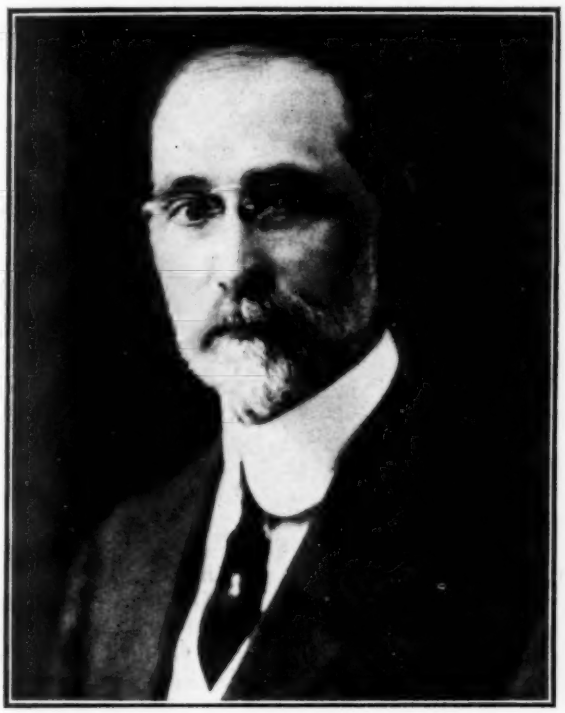
Among the doctor's more important articles were "The Comparative Value of Mydriatics," "School Hygiene," "The Genesis of the Myopic Eye," and "The Etiology of Uveitis." He devised a form of a "rotary prism" for the measurement of ocular imbalance, a phorometer, an ophthalmoscope combining cylinders with the usual spheres, a secondary cataract knife with its blade hand tooled so that the shaft, equalling the size of the corneal puncture, served as a check to the escape of vitreous.

Dr. Risley was twice married. First to Emma D. Thompson, on Mar. 11, 1870. To the union were born: Arthur Doty Risley, Sandusky, Ohio; Florence G. Risley, deceased; Helen Irma Ensor, Mt. Washington, Md.; Dr. John Norman Risley, New Bedford, Mass.; and R. Hildegarde Price, St. Paul, Minn. Dr. Risley married Julia Louise Robinson, on Jan. 16, 1907. To the union were born Parker Curtain Ris-

ley and Louise Risley, both of Media, Penna.

Dr. Risley was tall, rather slender, of a good complexion, and with dark brown eyes and iron gray hair. As a rule he wore a Van Dyke beard. He was a very social, kindly man, fraternal, cooperative, and especially helpful to the younger members of his specialty. He was active for public education, a Republican in politics, a member of the Protestant Episcopal church.

He died April 1, 1920, from lethargic encephalitis.



Samuel Doty Risley, 1845-1920.

RUSSELL, E. REID. An ophthalmologist and otolaryngologist of Asheville, N. C., was born at High Point, N. C., son of M. H. and Nancy Harris, Russel, on April 2, 1870. He received his first degree at the Virginia Military Institute, Lexington, Va., and his Doctor of Medicine, in 1895, at the University of Maryland.

For four years he practised general medicine at Hickory, N. C., and took a special course at the Presbyterian Eye, Ear, Nose and Throat Hospital, of Baltimore, his chief instructor being Prof. Hiram Woods.

In 1900 he began to practice the eye, ear, nose and throat at Charlotte, N. C., where he was one of the organizers of the Presbyterian Hospital. For a number of years he was Professor of Eye, Ear, Nose and Throat at Davidson and Charlotte. In 1904 he was elected President of the Charlotte Medical Society.

In 1910 he removed to Asheville, where he lived and practised till his death. On a number of occasions he made brief trips to Europe for the purpose of studying his specialties.

On Oct. 12, 1897, Dr. Russell married Miss Fannie Marler, of Hickory, by whom he had two sons. Late in November, 1919, the doctor received an infected wound of the hand, from which he died Nov. 27, 1919.

SHORTER, JAMES H. An eye and ear specialist of Macon, Ga. He was born near Seale, in Russell Co., Ala., in 1842. During the War he served in the Confederate army, and afterwards managed his mother's farms in Alabama. Having received his medical degree at the Long Island College Hospital in 1875, he studied the eye, ear, nose and throat with Dr. Hermann Knapp, and, for a time, practised as specialist in New York City. In 1890 he removed to Macon, Ga., where he practised as ophthalmologist and otolaryngologist until nearly the time of his death. He was a member of the American Academy of Ophthalmology and Otolaryngology, and of the American Laryngological, Rhinological and Otological Society. He died Feb. 2, 1920, after an illness of five months.

VALK, FRANCIS. A famous ophthalmologist of New York City, inventor of numerous ophthalmic instruments and author of the well known handbooks, "Errors of Refraction" and "Strabismus." He was born at Flushing, N. Y., son of a well known physician, William W. Valk, and Jane Sherwood (Jones) Valk, Oct. 28, 1846. He received a classical training at Washington College, Chestertown, Maryland, and the M.D. at New York University in 1878. During the War he enlisted in the northern army. For a time he was assistant surgeon to the Manhattan Eye and Ear Infirmary, and later surgeon. For very many years he was ophthalmic surgeon to the New York Dispensary and surgeon and visiting ophthalmologist to the Randall's Island Hospital, as well as consulting ophthalmic surgeon to the Thrall Hospital, Middletown, N. Y. He was Professor of Ophthalmology at the New York Post Graduate Medical School for many years, and Emeritus Professor for a brief time before his death. He was a Fellow of the New York Academy of Medicine, of the American Academy of Ophthalmology and Otolaryngology, the Clinical Society of the New York Post Graduate Medical School and Hospital, and many other medical societies, both general and special. Among the instruments which he invented were the Twin Strabismus Hooks and Needle-Point Cystitome.

Dr. Valk was a man of striking appearance and personality. He was six feet high, erect, slender of build, and with very sloping shoulders. His hair, mustache and imperial were all, in his later years, snow white. He affected the dress of a Methodist minister, and, altho a northern man by birth and residence, was almost invariably mistaken for a southerner. The writer remembers well his striking southern drawl and southern pronunciation. He almost always arose, at meetings, to discuss muscle conditions of the eyes, and was very clever, thoro, and forceful in his arguments. When speaking, he had a way of stooping over and gently bringing together the palms of his hands, which gave to all that he said an air of special earnestness.

He was always kindly and sympathetic, and the writer can never forget the warm-hearted manner in which he used to say: "Good-bye" to a student at the "P. G.," and to add: "Now *some* day, Doctor, *some* day, I know we shall meet again." He also had a way of asking students who had finished his course in ophthalmology at the Post-Graduate, to write to him fully, whenever they had a case on hand which gave them special trouble. "I shall always be glad to hear from you, you know," he would say. And his listener knew that he meant it.

Dr. Valk married, at Washington, D. C., in August, 1874, Miss Marian C. Easby of that city. To the union were born the following: Francis M. Valk, Mrs. Elizabeth V. Hay, and Jane Sherwood Valk.

The doctor died at St. Luke's Hospital, New York City, November 5 1919.

One cannot refrain from adding, in the words of the dear old teacher himself: "Good-bye, Doctor. I know that, *some* time, we shall meet again."

# NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo. Volunteers are nedeed in other localities.

### DEATHS.

Dr. Adolf Alt, St. Louis, Mo., died June 28, aged 69 years.

Dr. Henry Barnabas Hill, Logansport, Ind., died May 24, aged 54. He had practiced ophthalmology in Logansport for twenty-five years.

### SOCIETIES.

The American Academy of Ophthalmology and Oto-Laryngology will meet in Kansas City, Mo., October 14, 15 and 16.

The eleventh assembly of the Sociedad Oftalmologica Hispano-Americanos will convene at Granada, September 20 to 23. The subject for discussion will be "Hereditary Syphilis."

The eye, ear, nose and throat section of the Buchanan County Medical Society was organized at St. Joseph, Mo., March 10, Dr. Pierre J. Leonard was elected chairman, and Dr. William L. Kenney secretary of the section.

The Clinical Congress of the American College of Surgeons will this year be held at Montreal, October 11 to 15. The opportunities for seeing eye work in that city, altho excellent in quality, are limited in quantity, and as admission to the clinics is entirely by ticket, those who expect to attend them should make application early.

### PERSONAL.

Dr. H. Bert. Ellis and George H. Kress, of Los Angeles, have formed a partnership.

Mr. A. H. H. Sinclair, of Edinburgh, Scotland, attended the meeting of the American Ophthalmological Society in June. He is spending several weeks in the United States.

Dr. Luther C. Peter, of Philadelphia, has gone abroad to attend the meeting of the Oxford Ophthalmological Congress and to present the claims of the International Ophthalmological Congress to be held in Washington in 1922.

Dr. Edward Jackson spent some time in Washington, D. C., looking over facilities for entertaining the International Congress of Ophthalmology, which meets in that city in April, 1922.

Dr. Marcus Feingold, of New Orleans, Dr. Emery Hill, of Richmond, Va., Dr. William C. Finnoff, of Denver, Colo., Dr. A. O. Pfingst, of Louisville, Ky., and Dr. Wm. H. Roberts, of Pasadena, Calif., were this year elected to membership in the American Ophthalmological Society.

Dr. R. Pacheco-Luna, of Guatemala, is taking a two years' vacation and is at present in San Francisco. He expects to travel eastward in the fall and land in Paris next winter. He is a member of the Committee on Organization of the International Congress of Ophthalmology, which meets in Washington in 1922. He expects to promote abroad an interest in this meeting that will result in an increase in the attendance.

Dr. Howard Forde Hansell, professor of ophthalmology in Jefferson Medical College of Philadelphia, with Mrs. Hansell, sailed for Europe June 19 to spend the summer in travel that will include the battlefields of Belgium and France.

Dr. William M. Sweet, of Jefferson Medical College of Philadelphia, with Mrs. Sweet, sailed for Europe early in July to spend the summer, mainly at Aix-le-Bains, France.

Dr. Burton Chance, surgeon of Wills Eye Hospital of Philadelphia, with his family, is spending the summer in camp at the Ponoco Lake Preserve. Dr. Chance has recently moved to 1305 Spruce street.

Dr. William Campbell Posey will spend the vacation period with his family at their summer home at Watch Hill, R. I.

Dr. G. Oram Ring, of Philadelphia, has been appointed by Governor William C. Sproul a member of the Health Insurance Commission of Pennsylvania. Dr. Ring will spend the major portion of the summer at his camp at the Ponoco Lake Preserve.

Dr. L. Webster Fox, of Philadelphia, was the honor guest at a dinner given by a group of ophthalmologists at the Belgrade Lake Hotel, Maine, during the first week in June. Dr. Fox held an operative clinic during his visit at the Waterville Hospital. He and Mrs. Fox will spend the summer at San Francisco, Cal.

Dr. S. Lewis Ziegler, of Philadelphia, is spending the summer abroad. He will attend the Ophthalmic Congress at Oxford and will later attend the meeting to plan for an International Surgical Congress at Paris.

MISCELLANEOUS.

Illinois seems to be very active at present in handling the trachoma situation, which apparently has been on the spread.

A large number of trachoma cases have been found at Hammond, Ind. Precautions have been taken by the Indiana State Board of Health to prevent further spread of the disease.

A plague of blindness is sweeping the oasis towns of the Sahara Desert, eight of every ten children are now affected. So far the plague has not affected the adult Arab population to the same extent.

The National Committee for the Prevention of Blindness, 130 East Twenty-second Street, New York, is very much alive. Every ophthalmologist should receive their "News Letter," which is issued five times a year in the form of a pamphlet. It will be sent free to anyone who will make a request for it. This month the report of the Public Health Committee of the New York Academy of Medicine on wood alcohol poisoning is well worth reading.

In a paper published in the China Medical Journal on "Health Education in Schools of Higher Learning in China," written by Drs. Harvey J. Howard, W. G. Lennox and E. T. Hsieh, a program is proposed to combat blindness in China, where trachoma and gonorrhea are steadily increasing. The plan, altho developed to cover the whole field of public health and personal hygiene, gives special emphasis to those subjects relating to the conservation of vision.

The committee appointed in 1919 by the Council of British Ophthalmologists to ascertain to what extent the increasing number of street accidents might be due to defective vision on the part of drivers of motor vehicles, have made their report. It is divided into five parts. Based upon the report of its committee the Council of British Ophthalmologists now recommends that before a license be granted the applicant should be required to show his ability to steer a motor car around corners and to avoid obstacles, and before a license is renewed the applicant should be required to sign a statement that since it was granted he has not suffered from any physical disability likely to interfere with his driving capacity. An important recommendation is that special sight test certificates of three grades be granted to applicants whose sight has been tested by ophthalmic surgeons appointed for the purpose. Grade A entitles the holder to drive any kind of a motor vehicle; grade B shows his capacity to drive any vehicle other than a motor bus or tram car, and grade C his ability to drive a tram car.

A new edition of F. P. Maynard's "Manual of Ophthalmic Operations," and a new book, "A Manual of Ophthalmic Practice," are now in press. Thacker-Spink & Co., Calcutta, India, and E. and S. Livingstone, Edinburgh, are the publishers.

# OPHTHALMIC LITERATURE

These lists contain the titles of all papers bearing on Ophthalmology received within the preceeding month. These titles are all in English, some of them modified to indicate more clearly their subjects. These subjects are grouped under appropriate heads the succession of groups being the same from month to month. In the group the papers are arranged alphabetically usually by the name of the author in heavy-face type. After the subject of the paper (Ill.) indicates the number of illustrations. (Pl.) the number of plates, and (Col. pl.) colored plates illustrating the article. (Abst.) shows that it is an abstract of the original article. (Bibl.) tells that the paper is accompanied by an important bibliography. (Dis.) means that discussion of the subject is published with it. Under Repeated Titles are indicated additional publication of papers already noticed. To secure the earliest possible notice writers may send copies of their papers, or reprints, to 318 Majestic Bldg., Denver, Colo.

### DIAGNOSIS.

**Koby.** Ocular Miscroscopy with Gullstrand Lamp. Arch. d'Opht., v. 37, 1920, pp. 364-367.

**Koeppe, L.** The Nernst Slit Lamp and Corneal Microscope. (1 pl.) Graefe's Arch. f. Ophth., v. 101, 1919-20, pp. 32-47.

**Meisling.** Test Chart for Young Children. Hospitalstidende, v. 63, 1920, p. 20.

**Lindahl, C.** Transillumination for Diagnosis of Tumor of Choroid. Uppsala Läk. for Forhandl., v. 25, p. 1.

### THERAPEUTICS.

**Mukai, H.** Subconjunctival Injection of Hypotonic Sodium Chlorid Solutions. Nippon Gank. Zasshi, July, 1919.

Experiments on Intraocular Nutrition by Subcutaneous Injection of Pilocarpin. Nippon Gank. Zasshi, August, 1919.

### OPERATIONS.

**Watanabe, M.** Result of Skin Graft to Conjunctiva. (2 ill.) Nippon Gank. Zasshi, Oct., 1919.

### REFRACTION.

**Ashikaga.** Statistics of Myopia. Nippon Gank. Zasshi, Sept., 1919.

**Fuchs, E.** Accommodation and Presbyopia. España Oft., v. 5, 1920, p. 148.

**Gill, E. G.** Headaches from Standpoint of Ophthalmologist and Oto-Laryngologist. Med. Record, v. 98, 1920, p. 12.

**Gleichen, A. W.** Modern Optical Instruments. 376 p. London: H. M. Stationery Office.

**Hardwicke, W. W.** Sight Testing Made Easy. 4th Ed. London: J. and A. Churchill.

**Löhlein, W.** Headache and the Eyes. Deut. med. Woch., v. 46, 1920, pp. 29 and 87.

**Mazérès, G.** Measurement of Ametropia with Convex Lenses. (1 ill.) Arch. d'Opht., v. 37, 1920, pp. 357-364.

**Smith, H. E.** Reflex Disturbances Due to Eyestrain. New York Med. Jour., June 26, 1920, p. 1108.

**Steinheil, H. A.** Applied Optics, and Computation of Optical Systems. London: Blackie and Son.

### OCULAR MOVEMENTS.

**Cadwalader, W. B.** Bilateral Sympathetic Ophthalmoplegia in Lethargic Encephalitis. Arch. Neurol. and Psychiat., v. 4, 1920, p. 112.

**Dransart and Vanhoutte.** Paralysis of Right Externus after Cranial Injury. Arch. d'Opht., v. 37, 1920, p. 37[illegible].

**Gordon, A.** Ocular Symptoms in Cerebellar Lesions; Nystagmus. Arch. Neurol. and Psychiat., v. 4, 1920, p. 107.

**Pulleine, R.** Ophthalmoplegia. Med. Press, June, 1920, p. 440.

**Watari, S.** Treatment of Traumatic Paralysis of Inferior Rectus. Nippon Gank. Zasshi, Dec., 1919.

Repeated Titles. **Cantonnet** (v. 3, p. 555). Arch. of Neurol. and Psychiat., v. 4, p. 99.

### CONJUNCTIVA

**Bovero, A.** Cartilage of Plica or Third Lid in Mammals. Brazil Med., v. 24, 1920, p. 61.

**Brunetiere.** Pseudomembranous Actinomycosis of Conjunctiva. Arch. d'Opht., v. 37, 1920, p. 375.

**Chappé.** Conjunctivitis After Watching Cinema. Arch. d'Opht., v. 37, p. 378.

**Dabney, S. G.** Papilloma of Conjunctiva. Mississippi Valley Med. Jour., v. 27, 1920, p. 10.

**Darrieux.** Causes of Blindness Observed in 267 Infants Under Six Years. Arch. d'Opht., v. 37, 1920, p. 378.

**Gabrielides.** Etiology of Vernal Conjunctivitis. Arch. d'Opht., v. 37, p. 377.

**Ingersler, F.** Epidemic of Conjunctivitis in School Children. Bibliot. f. Laeger., v. 111, p. 528.

**Maderna, C.** Syphilitic Sclerosis of Conjunctiva. Med. Prat. Napoli, v. 5, pp. 13-17.

**Nicolle, C., Cuénod, H., and Blanc, G.** Trachoma Experiments on Rabbits. Arch. d'Opht., v. 37, p. 379.

**Oguchi, C.** Diagnosis of Ocular Secretions. Nippon Gank. Zasshi, Nov., 1919.

**Okamura, S.** Gonorrheal Ophthalmia. Nippon Gank. Zasshi, Dec., 1919.

**Sakaguchi, K.** Conjunctival Coccidium. Nippon Gank. Zasshi, Sept., 1919.

### CORNEA AND SCLERA.

**Akazuka.** Experiments on Rabbits' Corneas with Various Medicaments. Nippon Gank. Zasshi, Oct., 1919.

**Bywater, H. H., and Gorst, P. E.** Corneoscleral Cyst. Lancet, 1920, 1, p. 319.

**Fusiwara, K.** Marginal Atrophy of Cornea (4 ill.) Nippon Gank. Zasshi, Oct., 1919.

**Hirschberg, J.** Statistics of Corneal Disease in America. Cent. f. p. Augenh., Oct., 1917, p. 141; Nov.-Dec., p. 161.

**Komoto.** Operative Treatment of Corneal Phlyctenulosis. Nippon Gank. Zasshi, Dec., 1919.

Operation for Keratoconus. (2 ill.) Nippon Gank. Zasshi, Dec., 1919.

**Kuboki, H.** Histology of Corneal Degeneration. Nippon Gank. Zasshi, Aug., 1919.

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**Masuda, T.** Diffuse Superficial Keratitis. Nippon Gank. Zasshi, Dec., 1919.

**Nakamura, B., and Myake, Y.** Poisonous Effect of Methyl-violet on Cornea. Nippon Gank. Zasshi, Sept., 1919.

**Okasaki, G.** Intraocular Tension and Parenchymatous Keratitis. Nippon Gank. Zasshi, Nov., 1919.

**Olenchiu.** Use of Radium on Cornea of Japanese, and Refraction. Nippon Gank. Zasshi, Nov., 1919.

**Reiche, O. C.** Modern Treatment of Corneal Ulcers. Penn. Med. Jour., v. 23, 1920, p. 493.

**Rollet.** Ocular Zona. Arch. d'Opht., v. 37, 1920, pp. 322-326.

**Rönne, H.** Nonsyphilitic Parenchymatous Keratitis. Hospitalstidende, v. 63, p. 16.

**Takagi.** Peculiar Clouding of Cornea and Its Etiology. Nippon Gank. Zasshi, Aug., 1919.

**Van Lint.** Treatment of Corneal Ulcers with Tincture of Iodin and Yellow Ointment. Arch. d'Opht., v. 37, 1920, pp. 349-353, and 377.

**Ziemssen.** Traumatic Scleral Cyst. Berl. kl. Woch., v. 57, 1920, p. 22.

## ANTERIOR CHAMBER AND PUPIL.

**Byrne, J.** Paradoxical Pupil Dilatation Following Afferent Path Lesions. Amer. Jour. Physiol., v. 51, 1920, p. 188.

**Dercum, F. X.** Brain Tumor with Wernicke's Hemipupillary Inaction Sign. Arch. Neurol. and Psychiat., v. 4, 1920, p. 102.

**Kahn, R. H.** Treatment of Occlusion of Pupil. Graefe's Arch. f. Ophth., v. 101, pp. 105-110.

**Koeppe, L.** Microscopy of Angle of Anterior Chamber with Gullstrand Nernst Lamp. (1 pl.) Graefe's Arch. f. Ophth., v. 101, pp. 48-66.

**Myashita, S.** Influence of Eye Drops on Hemolysin in Anterior Chamber. Nippon Gank. Zasshi, Oct., 1919.

**Nakamura.** Changes in Anterior Chamber from Eye Drops. (Ill.) Nippon Gank. Zasshi, Nov.-Dec., 1919.

**Takao, J.** Pupillary Membrane with Pseudopupil. (2 ill.) Nippon Gank. Zasshi, Oct., 1919.

Repeated Titles. **Cockroft,** (v. 3, p. 556). Med. Rec., June 19, 1920, p. 1054.

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**Fuchs, E.** Intraocular Actinomycosis. Graefe's Arch. f. Ophth., v. 101, 1919-1920, pp. 24-31.

**Fusita.** Capillary Layer of Choroid. Nippon Gank. Zasshi, Aug., 1919.

**Holm, E.** Atrophic Uveitis. Hospitalstidende, v. 63, 1920, p. 13.

**Jacqueau and Lemoine.** Tenonitis and Iridochoroiditis. Arch. d'Opht., v. 37, 1920, p. 372.

**Rivi, G.** Luetic Ophthalmia Cured by Novoarsenobenzol. Ann. de Méd. Nav. Roma, 1919, 2, p. 1009.

**Terrien, F., Debré, R., and Paraf, J.** Gonococcic Iridochoroiditis Treated with Antigonococcic Serum. (7 ill.) Arch. d'Opht., v. 37, 1920, pp. 326-343.

**Yoshida, Y.** Pathologic Anatomy of Congenital Syphilitic Iritis. (1 ill.) Nippon Gank. Zasshi, Nov., 1919.

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**Thompson, J. H.** Surgical Treatment of Traumatic Cataract. Railway Surg. Jour., v. 36, 1919-1920, p. 113.

## VITREOUS.

**Myashita, S.** Opacity of Vitreous. Nippon Gank. Zasshi, Nov.-Dec., 1919.

**Suganuma, S.** Recurring Vitreous Hemorrhage. Nippon Gank. Zasshi, Aug., 1919.

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**Dresbach, M., Sutton, I. E., and Burbage, S. R.** Dark Adaptation of Peripheral Retina. Amer. Jour. Physiol., v. 51, 1920, p. 188.

**Fuchs, E.** Tuberculosis of Retina. Graefe's Arch. f. Ophth., v. 101, 1919-20, pp. 14-23.

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**Krückmann, E.** Septic Retinitis. Virchow's Arch. f. Path. Anat., etc., 1920, pp. 227-233.

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**Masuda, T.** Chorio-retinal Atrophy. Nippon Gank. Zasshi, Aug., 1919.

**Monchy de, S. J. R.** Light Phenomenon Described by Wassenaar. Nederl. Tijdschr. v. Geneesk., 1920, 1, p. 129.

**Morax, V.** Hypertony and Detachment of Retina. Arch. d'Opht., v. 37, 1920, p. 374.

**Stargardt.** Treatment of Detachment of Retina. Deut. med. Woch., v. 46, 1920, p. 30.

**Zorn, B.** Atypical Familial Pigment Degeneration of Retina with Total Atrophy of Choroid. (1 pl.) Graefe's Arch. f. Ophth., v. 101, pp. 1-13.

### TOXIC AMBLYOPIAS.

**Cutler, C. W.** Wood Alcohol and the Eyes. Med. Press, June, 1920, p. 438.

**Haas de, H. K.** Changes in Appearance of Nails in Optic Neuritis from Arsenic. Nederl. Tijdschr. v. Gennesk, 1920, 1, p. 272.

**Kjolbye, J.** Quinin Amblyopia with Unusual Field Defects. Hospitalstidende, v. 63, 1920, p. 22.

### OPTIC NERVE.

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**Shimazu, F.** Neuritis Caused by Inflammation in Anterior Part of Eye. Nippon Gank. Zasshi., July, 1919.

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### VISUAL TRACTS AND CENTERS.

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**Gordon, A.** Alexia. Arch. Neurol and Psychiat., v. 4, 1920, p. 108.

**Hikita, N.** Defects of Visual Fields. Nippon Gank. Zasshi, August-October, 1919.

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### COLOR VISION.

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**Verwey, A.** Loss of Eye thru Indirect Injury. Nederl. Tijdschr. v Geneesk. 1920, 1, p. 603.

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